1997 Cancer Statistics

Cancer Incidence and Mortality in North Dakota

Annual Report

November 1999

North Dakota Department of Health
Division of Health Promotion and Education
North Dakota Cancer Registry

NORTH DAKOTA
DEPARTMENT OF HEALTH
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PREVENTIVE HEALTH SECTION

Dear Colleague:

The North Dakota Cancer Registry is pleased to provide you with a copy of the registry's first annual report. *Cancer Incidence and Mortality In North Dakota* contains 1997 cancer incidence statistics and mortality data. In addition to presenting cancer data by sex, age and county, this report also includes information about risk factors and early detection for several primary cancer sites. The information also includes all reportable cancers newly diagnosed in 1997.

This report should be useful in understanding the impact of cancer among North Dakota residents and in developing and targeting prevention, screening and treatment programs.

Your comments and suggestions are welcome. We hope this report will serve as a resource for the general public, physicians and other health professionals, educators, the media, researchers and legislators throughout North Dakota.

Sincerely,

Marlys C. Knell CTR

Marlys C. Knell CTR
Coordinator
North Dakota Cancer Registry
Division of Health Promotion and Education
North Dakota Department of Health

North Dakota Cancer Registry's Annual Report on Cancer Incidence and Mortality in 1997

The North Dakota Cancer Registry, North Dakota Department of Health, welcomes any comments or suggestions about the content and format of this report. Please address all comments, questions and requests for further information or additional copies of this report to:

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Executive Summary

This first report of the North Dakota Cancer Registry (NDCR) incorporates cancer incidence and mortality data for the entire state. It represents the efforts of the North Dakota Department of Health, various medical facilities and cancer registrars throughout the state. This report is also available on the North Dakota website at www.health.state.nd.us.

In North Dakota, cancer became a reportable disease with passage of an Administrative Rule in 1996. With passage of the rule, the reporting of newly diagnosed primary cancers became mandatory for all medical diagnostic laboratories, physicians, health care providers, hospitals or health care facilities that furnish inpatient and/or outpatient screening, diagnostic or therapeutic services. (North Dakota Century Code Chapter 23-07-01 and Chapter 33-06-01). In 1997, data collection of newly diagnosed invasive cancers, in situ cancers and cancers of the central nervous system began. Basal and squamous cell cancers of the skin or carcinoma in situ of the cervix uteri were not included.

In 1997, malignant or invasive cancer was responsible for 1,318 of the 5,848 deaths in North Dakota. Cancer was the second leading cause of death following heart disease. Some cancers have a better prognosis (outcome) than other cancers. For example, cancers of the lung and pancreas have a poorer prognosis compared to cancers of the female breast and prostate.

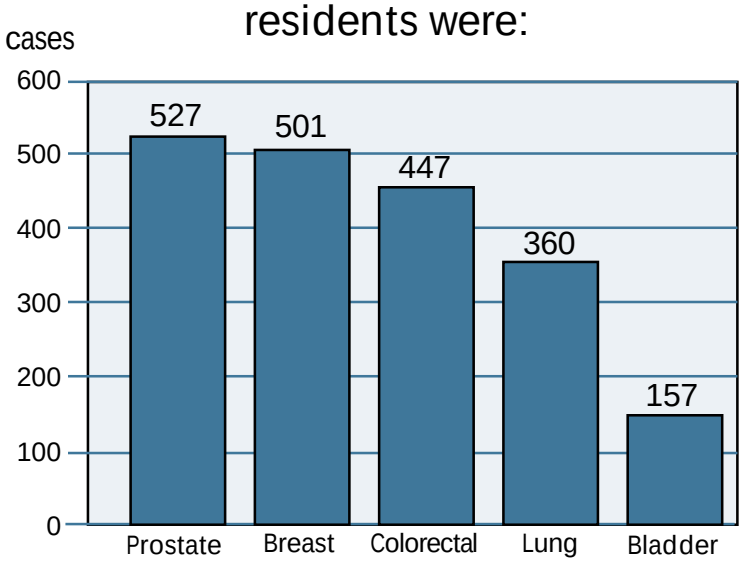
Cancer incidence and mortality vary across North Dakota, with cancer incidence rates higher than cancer mortality rates in all eight Regional Human Service Center regions. The likelihood of developing cancer increases with age; after age 50, age-specific incidence rates increase. Cancer incidence was greater at an earlier age for women than for men. However, at age 60, cancer incidence was greater among men than among women.

In 1997, the five most frequent cancers (invasive and in situ) in North Dakota residents were:

1. Prostate ..... 527 cases
2. Breast ..... 501 cases
3. Colorectal ..... 447 cases
4. Lung ..... 360 cases
5. Bladder ..... 157 cases

Table 1

In 1997, the five most frequent cancers (invasive and in situ) in North Dakota residents were:



This report of the North Dakota Cancer Registry summarizes information about all new cases of cancer and deaths due to cancer for North Dakota residents.

While this report includes data about all cancer sites, the following are highlighted: breast cancer, cervical cancer, childhood cancer, colorectal cancer, lung cancer, malignant melanoma and prostate cancer.

- **Breast cancer –** In 1997, 501 women were diagnosed with breast cancer and 106 residents died. Thirteen percent were diagnosed at the in situ stage and 48 percent with localized disease. For North Dakota women, breast cancer is the most frequently reported cancer and is the second leading cause of cancer death. Lung cancer is the leading cause of cancer-related death for North Dakota women. Breast cancer also was the second most common cancer diagnosed.

- **Cervical cancer –** Twenty-two women were diagnosed with cervical cancer; of those, 30 percent were diagnosed with regional disease and 11 percent with distant disease. Eleven residents died from cervical cancer. NDCR does not collect CIN III or carcinoma in situ of the cervix.

- **Childhood cancer –** Twenty-one children were diagnosed with cancer in 1997 and fewer than five children died. Acute lymphocytic leukemia (ALL) was the most common childhood cancer diagnosed.

- **Colorectal cancer** – In 1997, 447 residents were diagnosed with colorectal cancer; of those, 43 percent were diagnosed with regional disease. A total of 157 residents died from colorectal cancer, which was the third most common cancer in 1997.

- **Lung cancer** – In 1997, 360 residents were diagnosed with lung cancer and 317 died. About 44 percent were diagnosed with distant disease. Lung cancer was the fourth most common cancer diagnosed in 1997 (after prostate, female breast and colorectal cancers) and is the leading cause of cancer deaths in North Dakota.

- **Malignant melanoma** – In 1997, 68 residents were diagnosed with malignant melanoma, of which 58 percent were diagnosed with localized stage disease. Thirteen deaths were attributed to malignant melanoma in 1997.

- **Prostate cancer** – A total of 527 men were diagnosed with prostate cancer and 103 residents died. Prostate cancer was the second leading cause of death for men in 1997.

As further cancer incidence and cancer mortality data become available, this data can be used to plan and evaluate cancer control measures in the areas of prevention, early detection, public and professional education, statistical analysis, surveillance and research.

Introduction and Technical Preface

During 1997, an average of three people died from cancer in North Dakota every day. Cancer is second only to heart disease as a leading cause of death among the state's residents. These statistics are available from mortality data provided by the North Dakota Department of Health, Division of Vital Records. Mortality can describe only a part of the burden that cancer places on North Dakota residents. Now, with incidence data from the recently established statewide cancer registry, we can describe the additional impact that cancer places on the state's residents.

During 1997, an average of three people died from cancer in North Dakota every day. Cancer is second only to heart disease as a leading cause of death among the state's residents.

With this report, the North Dakota Cancer Registry (NDCR) makes a general report to the public on the status of cancer among North Dakota's residents. This report will focus on:

- A description of the North Dakota Cancer Registry and its goals.
- A summary of cancer data for 1997.
- Highlighted data on selected cancer types.

Following an overview of the incidence and mortality of cancer in North Dakota, this report highlights selected cancer types diagnosed in the state's residents during 1997.

As part of the goal to provide a simple, descriptive summary of cancer in North Dakota's population, no formal statistical testing of differences in incidence or mortality was conducted or presented in the main narrative of this document. However, the statistical tables presented in Appendix A provide data (i.e., age-adjusted rates and standard errors) for the individual researcher to perform such statistical testing. Except where indicated, all data in this report are North Dakota resident data and cover the year 1997, representing the first year of cancer incidence reporting in the state. Cancer incidence is classified using the International Classification of Disease - Oncology (ICD-O). Information on cancer mortality was obtained from the Division of Vital Records death certificate master file.[1] Several analytical measures of cancer data are used throughout this report. These measures include crude, age-specific and age-adjusted rates, as well as years of potential life lost and mortality-incidence ratio. Detailed descriptions of these analytical measures may be found in the Glossary and the Technical Notes.

[1] Mortality data in this report may differ from mortality data published by the North Dakota Department of Health's Division of Vital Records. Such differences are attributed to different population denominators released by the U.S. Census and/or differing levels of precision on age-adjusting standard population weights.

The North Dakota Cancer Registry

Cancer is a reportable disease as stated in the North Dakota Administrative Rules. On July 1, 1996, Administrative Rules were adopted for mandatory reporting of all invasive and in situ carcinomas (except basal and squamous cell skin carcinomas or in situ carcinoma of the cervix uteri) and tumors of the central nervous system. Required to report are all medical diagnostic laboratories, physicians, and other health care providers who administer screening, diagnostic or therapeutic services. Also required to report are hospitals and other health care facilities that provide inpatient and/or outpatient services and mobile units that provide screening, diagnostic or therapeutic services. (North Dakota Century Code Chapters 23-07-01 and 33-06-01)

The primary purpose of the cancer registry is to support cancer control by targeting, monitoring and evaluating programs that promote early detection, diagnosis and treatment of cancer. The cancer registry supports efforts by community hospitals and health systems with respect to the evaluation of their cancer patient care. The cancer registry supports local health agencies and providers by:

- Providing summary statistics on the distribution of cancer cases by type.
- Following cancer incidence and treatment trends throughout the state.
- Facilitating rapid reporting of cancer, thereby allowing state or local health officials to assess suspected cancer clusters or suspected cancer hazards in their local communities.
- Providing accurate cancer data for cancer-related reports to legislative bodies and agencies.

The primary purpose of the cancer registry is to support cancer control by targeting, monitoring and evaluating programs that promote early detection, diagnosis and treatment of cancer.

Little population-based cancer research has been conducted in North Dakota. As a statewide population-based registry, the cancer registry provides the data for future epidemiological research related to cancer-control activities throughout the state.

Cancer in North Dakota

Cancer is a diverse group of diseases characterized by the proliferation of abnormal cells. These cells can invade and destroy surrounding tissue and spread (metastasize) to distant parts of the body. While some cancers share common causes, or risk factors, it is believed that most cancers have a unique set of factors that are responsible for their initiation.

The impact of cancer on North Dakota is significant. The recent establishment of the North Dakota Cancer Registry (NDCR) provides a mechanism of cancer surveillance. From data collected by the NDCR in combination with other public health data sources, we now can provide answers to the following public health questions:

- Which cancers are the most common in our state?
- Who is at greatest risk for developing cancer?
- Which cancers are the deadliest (most deaths per diagnosed cases)?
- What are the societal costs of cancer in North Dakota?
- How can cancer registry data be used for disease surveillance?
- How does North Dakota compare to other states and national prevention standards?

Previously, data on cancer in North Dakota was limited to mortality information from death certificates. As you will see in this report, this new incidence data enhances our level of knowledge and provides a different perspective of the cancer disease burden in our state.

Table 2

Fast Facts

North Dakota	Total	Male	Female
Incidence			
Invasive cases	2,993	1,661	1,332
Crude Rate	462.1	514.0	410.4
Mortality			
Total deaths	1,318	713	605
Crude Rate	203.5	220.6	186.4

All rates expressed per 100,000 population. New cases are invasive cancers and include in situ bladder cancers. Incidence rates do not include in situ cancers, with the exception of bladder cancer.

Which Cancers Are the Most Common in Our State?

Every day eight people are diagnosed with cancer in North Dakota, and about three people die. Cancer is the second leading cause of death in the state after heart disease. During 1997, 2,993 new invasive cancers were diagnosed among residents and reported to the state cancer registry. In the same year, 1,318 residents died from cancer. More men were diagnosed and died from cancer as compared to women, a pattern that is similar to the national data.

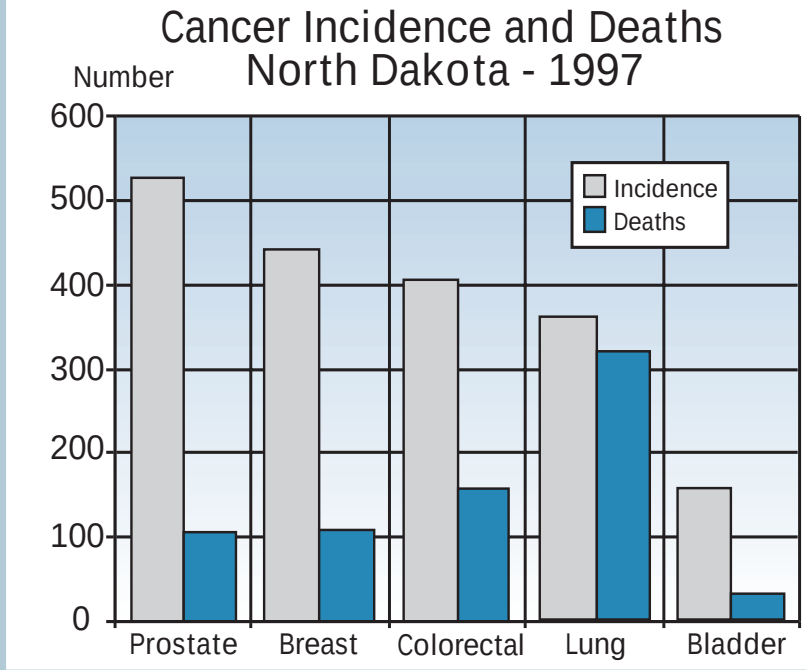
The five most common types of cancer reported to the state's cancer registry (both sexes combined) during 1997 were:

1. Prostate cancer
2. Breast cancer
3. Colorectal cancer
4. Lung cancer
5. Bladder cancer

Whereas prostate and breast cancer are the two most frequently reported cancers, lung cancer is the leading cause of cancer- related death (followed by colorectal cancer).

For North Dakota men, prostate and lung cancer are the two most frequently reported cancers; for North Dakota women, breast and colorectal cancer are the two most frequently reported cancers.

Table 3



Who Is at Greatest Risk for Developing Cancer?

Everyone is at risk for developing cancer. The risk of developing cancer increases with age; most cases affect adults during middle age or older. North Dakota's age-specific incidence rate sharply increases after age 50. (Table 4) At earlier ages, cancer incidence is greater among women than men. This is primarily due to the nature of many female-specific cancers (i.e., breast and cervical cancer) that occur at younger ages, as compared to other cancers such as lung cancer. At age 60, cancer incidence is greater among men than women.

Fortunately, the chances of being diagnosed with many types of cancer can be reduced through positive health practices such as smoking cessation, physical exercise and healthy eating habits.

Table 4

Age-specific Incidence Rates North Dakota 1997

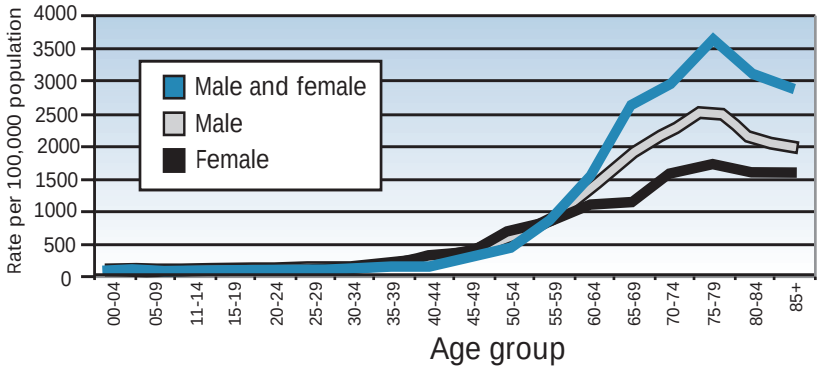
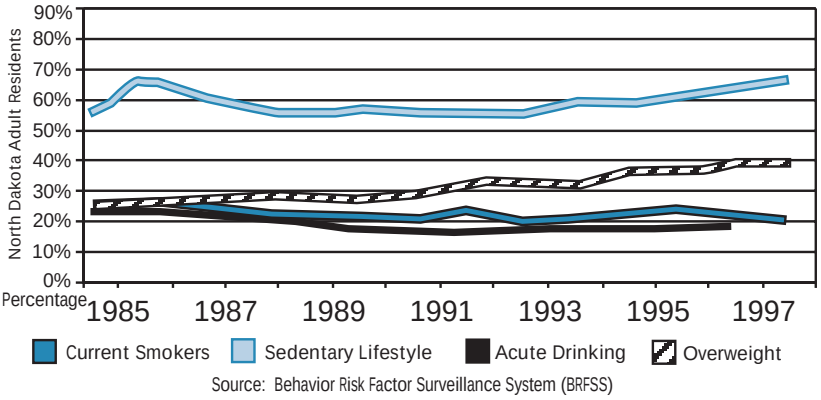


Table 5

North Dakota's Health Behavior Risk Factors



Source: Behavior Risk Factor Surveillance System (BRFSS)

The greatest risk factor for all cancers is tobacco use. Smokers are ten times more likely to develop lung cancer as compared to non-smokers. Many cancers are preventable by avoiding tobacco (i.e., cigarettes, cigars, pipe tobacco, chew, spit, snuff, etc.). Since 1985, the percentage of adults who currently smoke has been fairly stable — about 20 percent. Dietary habits such as eating fresh fruits, vegetables and whole grains, as well as moderating alcohol consumption, may help reduce the risk of developing cancer. Acute drinking in the state has shown some decline since 1985. (Table 5)

Which Cancers Are the Deadliest?

Some cancers are more deadly than others. Cancers with good early detection screening and treatment regimens (such as breast cancer) have better survival outcomes as compared to other cancers (such as lung cancer) that tend to be diagnosed at more advanced stages of disease.

The mortality-to-incidence (M/I) ratio provides a measure of cancer severity or prognosis. Simply put, it is the number of deaths from a particular cancer divided by the number of new cases. The M/I ratio may be interpreted as the case fatality rate, or the probability of dying from a disease. The closer the M/I ratio value is to 1.0, the poorer the prognosis for the cancer.

Table 6

Mortality-to-Incidence (MI) Ratios North Dakota 1997

Cancer	Both Sexes	Male	Female
All Cancers	0.44	0.43	0.45
Female Breast	0.24	^	0.24
Cervix	0.50	n/a	0.50
Colorectal	0.39	0.42	0.35
Lung	0.88	0.88	0.88
Pancreas	0.88	0.81	0.95
Malignant Melanoma	0.23	0.19	0.29
Prostate	n/a	0.20	n/a

^Statistic not displayed due to less than 5 incidence and/or mortality cases.

Cancers can be classified into three groups with respect to their M/I ratio:

- Cancers with a good prognosis (a ratio of .33 or less)
- Cancers with a fair prognosis (a ratio between .33 and .66)
- Cancers with a poor prognosis (a ratio greater than .66)

Table 6 provides M/I ratios for selected cancer types in North Dakota for men, women and both sexes combined. Cancers of the lung and pancreas have the poorest prognosis with an M/I ratio of .88 for both sexes combined. Cancers of the breast and prostate have a good prognosis with M/I ratios under .33.

What Are the Societal Costs of Cancer in North Dakota?

Societal costs of any disease are both economic and non-economic. The National Institutes of Health estimates the nation's overall annual costs for cancer at $107 billion. This overall cost can be itemized as $37 billion for direct medical costs (i.e., total health expenditures), another $11 billion for indirect morbidity costs (i.e., cost of lost productivity due to illness), and $59 billion for indirect mortality costs (i.e., cost of lost productivity due to premature death). Moreover, the treatment of breast, lung and prostate cancers account for more than one-half of the direct medical costs in the United States.[2]

An individual's pre-mature death places an enormous burden on family members, friends and the broader community. The measure of years of potential life lost (YPLL) takes into consideration the greater costs to society of people dying at younger ages. For example, using a mature mortality

Table 7 Years of Potential Life Lost (YPLL) North Dakota 1997

Cancer	Before Age 65	Before Age 70	Before Age 75	Before Age 80
All Causes of Death	72,475	99,710	135,070	184,860
All Malignant Cancers	18,720	29,510	41,405	55,250
Oral Cavity and Pharynx	390	585	780	975
Colon and Rectum	1,560	2,535	3,510	5,070
Liver	455	585	715	910
Pancreas	780	1,365	1,820	2,600
Lung and Bronchus	5,395	9,360	13,260	16,445
Melanomas of the Skin	260	325	390	455
Breast	1,690	2,470	3,250	4,095
Cervix	325	455	585	650
Ovary	715	910	1,495	1,950
Prostate	325	650	1,690	3,250
Testis	0	0	0	0
Urinary Bladder	325	455	585	910
Lymphomas	780	1,170	1,755	2,600
Leukemias	910	1,690	2,275	2,925
Diseases of Heart	16,705	24,960	35,490	50,505
Accidents and Adverse Effects	9,815	10,270	10,790	11,895
Suicide and Self-Inflicted Injury	4,550	4,680	4,745	4,745
Homicide and Legal Intervention	520	585	585	585

[2] Source: "Cancer Facts & Figures – 1999," American Cancer Society, Atlanta, Ga., 1999.

age of death of 65 years, a person dying at age 25 would have 40 years of potential life lost (65-25=40). The YPLL is one method of evaluating the burden of a disease upon a population.

Whereas heart disease is the leading cause of death in North Dakota, cancer is the leading cause of years of potential life lost. In other words, cancer places a greater societal cost on North Dakota due to premature death (as measured by YPLL) as compared to heart disease, accidents, suicide or homicide. Of all cancers, lung cancer, followed by breast cancer and colorectal cancer, contributes the most to YPLL.

How Does North Dakota Compare to Other States and National Prevention Standards?

Overall, the incidence of all cancers (combined) is lower in North Dakota as compared to the United States and the neighboring states of Minnesota and Montana.[3] North Dakota men have a lower incidence of prostate and lung cancer, and North Dakota women have a lower incidence of breast and lung cancer.

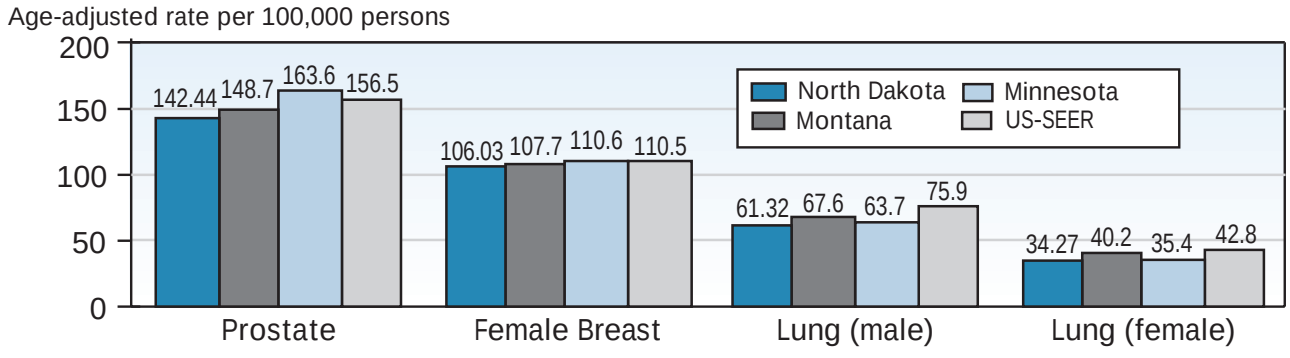
Data comparisons between North Dakota data and other population-based data (such as the United States and other states) should be interpreted with caution. Single-year data from the North Dakota Cancer Registry is much more variable as compared to multiple year data from the more established registries of SEER (Surviellance Epidemiology and End Results), Minnesota and Montana.

How Does North Dakota Compare With the Healthy People 2000 Objectives for Cancer Control?

Healthy People 2000 is a statement of national opportunities. It is the

Table 8

Cancer Incidence Comparison



[3] United States data comes from SEER Cancer Statistics Review 1973-1996, (Table I-6), SEER. Minnesota and Montana data comes from Cancer in North America 1991-1995: Vol. 1 Incidence, NAACCR. South Dakota data is not shown because they currently do not have a population- based statewide cancer registry. All rates are age-adjusted to the 1970 United States population for comparison purposes.

Table 9

How Does North Dakota Compare With the Healthy People 2000 Objectives for Cancer Control?

Healthy People 2000 Objective	Goal	North Dakota
Reverse the rise in cancer deaths to achieve a rate of no more than 175 per 100,000 people.	175	143.3
Slow the rise in lung cancer deaths to achieve a rate of no more than 53 per 100,000 people.	53	38.7
Reduce breast cancer deaths to no more that 25.2 per 100,000 women.	25.2	20.3
Reduce deaths from cancer of the uterine cervix to no more than 1.5 per 100,000 women	1.5	2.8
Reduce colorectal cancer deaths to no more than 18.7 per 100,000 people.	18.7	15.3

Rates are age-adjusted to the 1970 United States population. Baseline is a starting point from which the Healthy People 2000 Objective was determined and is determined from 1987 national data.

product of a national effort, involving 22 expert working groups, a consortium that has grown to include almost 300 national organizations, all the state health departments, and the Institute of Medicine of the National Academy of Science. This national effort outlined several national health promotion and disease prevention objectives.

The table above compares North Dakota's 1997 cancer mortality data with the Healthy People 2000 Objectives for cancer control. Although North Dakota is ahead of most of the mortality reduction objectives, the state is behind the national objective to reduce deaths from cervical cancer to 1.5 per 100,000 women.

How Can Cancer Registry Data Be Used for Disease Surveillance?

The cancer registry can support cancer control by targeting, monitoring and evaluating programs that promote early detection, diagnosis and treatment of cancer. An objective of the North Dakota Cancer Registry is to provide disease surveillance to identify communities that could benefit from cancer-program planning.

The rates of cancer incidence and mortality vary throughout the state. Evaluating the state's cancer incidence and mortality data geographically we see:[4]

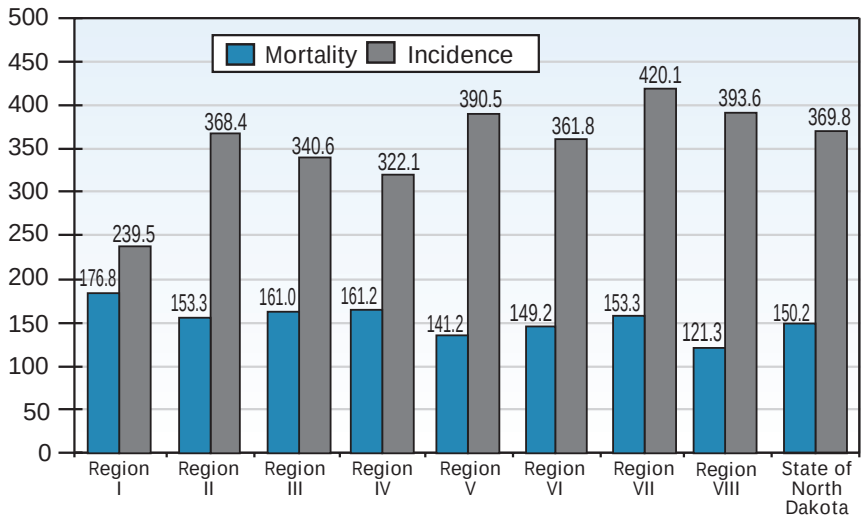
- Incidence rates of cancer are higher than mortality rates in every region of the state.
- With the exception of Region I, incidence rates are similar across the state.
- Region I is the only region with a significantly lower incidence of cancer as compared to the state's average incidence rate.
- Mortality rates are similar across the state.

Although significant differences in incidence rates exist, these differences must be interpreted with caution. Such significant

[4] North Dakota county boundaries are aggregated into eight Regional Human Service Center regions. Please refer to the Technical Notes for an explanation of which counties comprise each planning region.

Table 10

Age-adjusted Cancer Incidence Rates by Region



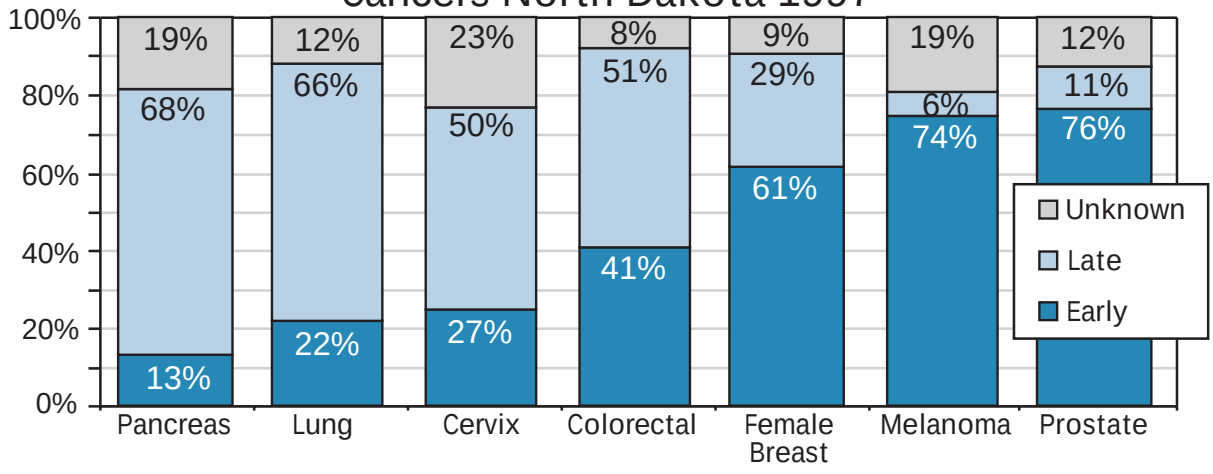
differences may change through time as cancer reporting improves and as more data is collected, thereby providing more stable incidence rate numbers.[5]

Detecting a cancer at an earlier stage of development as compared to later stage results in improved survival and/or mortality reductions for some cancers. One objective of a cancer screening program is to detect a cancer in its earliest stages of development, or (as in the case of cervical and colorectal cancer) to detect a pre-cancerous condition.

In North Dakota, about 76 percent of prostate cancers, 74 percent of malignant melanomas and about 61 percent of female breast cancers were diagnosed at an early stage (in situ and localized stages combined). Lung cancer (a disease which is difficult to detect before it becomes symptomatic) is more likely to be diagnosed at later invasive stages, with 22 percent diagnosed at an early stage.

Table 11

Distribution of Stage at Diagnosis for Selected Cancers North Dakota 1997



[5] Please refer to the Technical Notes for an explanation of incidence rates comparison.

Highlights of Selected Cancers[6]

The following highlights from North Dakota cancer incidence and mortality during 1997 provide information about known risk factors and early detection for selected cancer types.

Female Breast Cancer

New Cases: In North Dakota, 505 women were diagnosed with breast cancer during 1997. It is the leading cause of cancer incidence in women. About 13 percent were diagnosed at the early in situ stage, and an additional 48 percent were diagnosed at the earliest invasive stage (localized). Nationally about 1 percent of breast cancers are diagnosed in men; in North Dakota five men or 1.1 percent were diagnosed with breast cancer during 1997.

Deaths: During 1997, 106 North Dakota women died from breast cancer. After lung cancer it is the second leading cause of cancer-related death among North Dakota women.

Risk Factors: Being a woman and getting older are the leading risk factors for developing breast cancer. Research suggests the risk tends to be higher for a woman who has: 1) a family history of breast cancer; 2) a biopsy-confirmed atypical hyperplasia; 3) early menarche; 4) late menopause; 5) recent use of oral contraceptives or postmenopausal estrogens: 6) never had children; 7) had her first live birth at a late age, or 8) higher education and socioeconomic status.

> One study found the risk of breast cancer was reduced by 20% in women ages 20 to 49 years and by 30% in women ages 50-74 years who had breastfed, compared to women who had not breastfed.
>
> International Journal of Epidemiology (1999;28:396-402)

Early Detection: Early detection through routine clinical breast examination and mammography provides the best opportunity to reduce breast cancer mortality. Together, clinical breast examination and mammography can identify breast abnormalities that may indicate early stages of cancer before physical symptoms develop.

Cervical Cancer

New Cases: In North Dakota, 27 women were diagnosed with

[6] Information provided on risk factors and early detection comes from "Cancer Facts and Figures – 1999," American Cancer Society, Atlanta, Ga., 1999.

cervical cancer during 1997. About 30 percent were diagnosed at regional invasive stage, and an additional 11 percent were diagnosed at distant metastatic spread.

Deaths: During 1997, 11 women died from cervical cancer. Since cervical cancer is preventable when detected at pre-cancerous stages (i.e., High Grade SIL and CIN 3), women should not die from cervical cancer.

Risk Factors: The risk of developing cervical cancer is related closely to sexual behavior and sexually transmitted diseases, including certain types of human papillomavirus. Identified risk factors include having first intercourse at an early age; multiple sexual partners, or partners who have had multiple sexual partners; cigarette smoking; and low socioeconomic status.

Early Detection: Fortunately, cervical cancer is preventable. By following a routine screening schedule that includes a pelvic exam and Pap test, a pre-cancerous condition can be detected and treated, thereby preventing the development of cervical cancer.

Nationally, mortality rates of childhood cancer have declined 57 percent since the early 1970s.

Cancer Facts & Figures 1999

Childhood Cancer

New Cases: During 1997, twenty-one North Dakota children (ages 0 to 14) were diagnosed with cancer. As a childhood disease, cancer is rare. Nationally, leukemia is the most common childhood cancer; in North Dakota Acute Lymphocytic Leukemia (ALL) was the most common type of childhood cancer reported to the registry.

Deaths: During 1997, fewer than five North Dakota children died from cancer. Nationally, cancer is a leading cause of death in children younger than 15; however, national mortality rates have declined 57 percent since the early 1970s.

Early Detection: Childhood cancers often are difficult to detect. Most childhood cancers occur in children younger than age 4. The common sites of childhood cancers include blood and bone marrow, bone, lymph nodes, brain, sympathetic nervous system, kidneys and soft tissues.

Colorectal Cancer

New Cases: Colorectal cancer is the third most common cancer among residents of North Dakota. During 1997, 448 residents were diagnosed with colorectal cancer, resulting in a crude incidence rate of 62.2 per 100,000 people. Nationally, incidence rates have declined significantly since 1990. This national decline may be explained by increased screening to detect and remove polyps before their progression to invasive cancer.

Deaths: During 1997, 157 residents died from colorectal cancer,

> Obesity may directly contribute to colon cancer risk by promoting cancerous changes in cells, or it may be a "marker" for other dangerous risk factors such as poor diet or lack of physical activity.
>
> American Journal of Epidemiology (1999:150:390-398)

resulting in a crude mortality rate of 24.2 per 100,000 people. Nationally, mortality rates from colorectal cancer have declined during the past 20 years.

Risk Factors: A personal or family history of colorectal cancer, polyps or inflammatory bowel disease have been associated with increased colorectal cancer risk. Other possible risk factors include physical inactivity and a diet high in fat and low in fiber.

Early Detection: Beginning at age 50, both men and women should have the following: (1) Fecal Occult Blood Test (FOBT) and flexible sigmoidoscopy. If normal, repeat FOBT annually, and flexible sigmoidoscopy every five years. (2) Colonoscopy. If normal, repeat colonoscopy every 10 years. (3) Double-constant barium enema. If normal, repeat double-contrast barium enema every five to 10 years. A digital rectal exam also should be performed, along with a sigmoidoscopy, colonoscopy or double-contrast barium enema.[7]

Lung Cancer

New Cases: In North Dakota, 361 residents were diagnosed with lung cancer in 1997, for a crude incidence rate of 55.7 per 100,000 people. Approximately 44 percent were diagnosed at distant metastatic spread.

Deaths: During 1997, 317 residents died from lung cancer, for a crude mortality rate of 49.6 per 100,000 people. Lung cancer is the leading cause of cancer-related death among all North Dakota residents.

Risk Factors: Tobacco smoking is the most important risk factor for developing lung cancer. Other risk factors include exposure to some industrial substances and organic chemicals such as arsenic, radon and asbestos.

Early Detection: Unfortunately, early detection of lung cancer is difficult. This is because symptoms usually do not appear until the disease is in advanced stages of development. However, in people who stop smoking when precancerous changes are discovered, damaged lung tissue often returns to normal. Chest X-ray, analysis of cells contained in sputum, and fiberoptic examination of the bronchial passages assist in the diagnosis of lung cancer.

[7] Information provided on risk factors and early detection comes from "Cancer Facts and Figures – 1999," American Cancer Society, Atlanta, Ga., 1999.

Malignant Melanoma

New Cases: In 1997, 68 North Dakota residents were diagnosed with malignant melanoma of which 16 percent were diagnosed at the in situ stage, and another 58 percent at the localized stage.

Deaths: During 1997, 13 North Dakota residents died from malignant melanoma.

Risk Factors: Exposure to the sun (ultraviolet radiation); a fair complexion; occupational exposure to coal tar, pitch, creosote, arsenic compounds, or radium; and multiple and/or atypical nevi (moles) are all risk factors for malignant melanoma.

Early Detection: Recognition of changes in skin growths or the appearance of new growths is the best way to find early skin cancers. Individuals should practice skin self-examination regularly, and suspicious moles should be evaluated promptly by a physician. Ultraviolet rays from the sun are the strongest during the middle of the day (10 a.m. to 4 p.m.); individuals should avoid or limit their sun exposure during these times of the day. When outdoors, individuals should wear broad brimmed hats, long-sleeved shirts and long pants.

Prostate Cancer

New Cases: Prostate cancer is the most commonly diagnosed cancer among men in North Dakota. In 1997, 528 men were diagnosed, for a crude incidence rate of 162.5 per 100,000 men.

Deaths: During 1997, 103 North Dakota men died from prostate cancer. Prostate cancer is the second leading cause of cancer death among men in our state.

Risk Factors: Prostate cancer incidence increases with age; most prostate cancers were diagnosed in North Dakota men older than 65.

Early Detection: A man age 50 or older who has a life expectancy of at least 10 years should consult his health care professional about having a digital rectal exam and a prostate-specific antigen (PSA) blood test every year.

Appendix A
Tables

Introduction and Technical Preface

Appendix A of North Dakota Cancer Registry's Annual Report on Cancer Incidence and Mortality provides a series of statistical tables on cancer incidence, mortality, burden and reporting completeness for the 1997 reporting year. The North Dakota Cancer Registry (NDCR) provides the incidence data. The mortality data comes from Leading and Selected Resident Cancer Deaths: North Dakota 1997 and 1993-1997 Combined provided by the Division of Vital Records. Population denominators used in the calculation of North Dakota incidence and mortality rates comes from the U.S. Bureau of the Census.

As part of the goal to provide a concise, descriptive summary of cancer statistics in North Dakota's population, no formal statistical testing of differences in incidence or mortality is presented in the following tables. However, wherever possible, the tables provide necessary data for the individual researcher to perform such statistical testing (i.e., standard error). Except where indicated, all data is North Dakota data and covers the year 1997, representing the first year of cancer incidence reporting in the state. Cancer incidence is classified using the International Classification of Disease - Oncology (ICD-O). Cancer mortality is classified using the International Classification of Disease – 9 (ICD-9).

Several analytical measures are presented in the statistical tables. These measures include crude incidence rate, age-adjusted incidence rate, distribution of stage at diagnosis, years of potential life lost, and mortality-incidence ratio. Detailed descriptions of these analytical measures may be found in the Technical Notes in Appendix B.

List of Statistical Tables

Table 1: North Dakota Cancer Incidence by Cancer Type and Sex.

	Male and female					Male					Female				
	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE
All Sites	2,993	369.8	7.1	462.1	8.5	1,661	449.3	11.3	514.0	12.6	1,332	309.1	9.0	410.4	11.3
Oral Cavity and Pharynx	52	6.8	1.0	8.0	1.1	37	10.6	1.8	11.5	1.9	15	3.7	1.0	4.6	1.2
Lip	12	1.4	0.4	1.9	0.5	11	2.8	0.9	3.4	1.0	^	^	^	^	^
Tongue	7	0.9	0.4	1.1	0.4	5	1.5	0.7	1.6	0.7	^	^	^	^	^
Salivary Gland	10	1.4	0.4	1.5	0.5	^	^	^	^	^	6	1.5	0.7	1.9	0.8
Floor of Mouth	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Gum and Other Mouth	6	0.7	0.3	0.9	0.4	^	^	^	^	^	^	^	^	^	^
Nasopharynx	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Tonsil	5	0.8	0.4	0.8	0.4	5	1.6	0.7	1.6	0.7	^	^	~	^	~
Oropharynx	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Hypopharynx	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Other Oral Cavity and Pharynx	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Digestive System	607	69.8	3.0	93.7	3.8	349	92.2	5.1	108.0	5.8	258	51.1	3.5	79.5	5.0
Esophagus	35	4.2	0.7	5.4	0.9	34	9.0	1.6	10.5	1.8	^	^	^	^	^
Stomach	54	5.9	0.9	8.3	1.1	43	11.0	1.7	13.3	2.0	11	1.7	0.6	3.4	1.0
Small Intestine	11	1.2	0.4	1.7	0.5	7	1.7	0.7	2.2	0.8	^	^	^	^	^
Colon and Rectum	403	46.5	2.4	62.2	3.1	215	57.7	4.0	66.5	4.5	188	36.7	2.9	57.9	4.2
Colon excluding Rectum	302	34.2	2.1	46.6	2.7	154	40.8	3.4	47.7	3.8	148	28.5	2.6	45.6	3.8
Cecum	75	8.1	1.0	11.6	1.3	36	9.4	1.6	11.1	1.9	39	6.8	1.2	12.0	1.9
Appendix	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Ascending Colon	70	7.7	1.0	10.8	1.3	32	8.3	1.5	9.9	1.8	38	6.9	1.2	11.7	1.9
Hepatic Flexure	15	1.6	0.4	2.3	0.6	10	2.3	0.7	3.1	1.0	5	1.2	0.6	1.5	0.7
Transverse Colon	32	3.7	0.7	4.9	0.9	15	4.2	1.1	4.6	1.2	17	3.1	0.8	5.2	1.3
Splenic Flexure	8	0.9	0.3	1.2	0.4	6	1.6	0.7	1.9	0.8	^	^	^	^	^
Descending Colon	23	2.8	0.6	3.6	0.7	12	3.3	1.0	3.7	1.1	11	2.4	0.8	3.4	1.0
Sigmoid Colon	65	8.0	1.0	10.0	1.2	34	9.5	1.7	10.5	1.8	31	6.7	1.3	9.6	1.7
Large Intestine, NOS	10	1.1	0.4	1.5	0.5	6	1.5	0.6	1.9	0.8	^	^	^	^	^
Rectum and Rectosigmoid Junction	101	12.2	1.3	15.6	1.6	61	16.9	2.2	18.9	2.4	40	8.2	1.4	12.3	2.0
Rectosigmoid Junction	17	2.0	0.5	2.6	0.6	8	2.2	0.8	2.5	0.9	9	1.8	0.7	2.8	0.9
Rectum	84	10.2	1.2	13.0	1.4	53	14.6	2.1	16.4	2.3	31	6.4	1.2	9.6	1.7
Anus, Anal Canal and Anorectum	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Liver and Intrahepatic Bile Duct	9	1.1	0.4	1.4	0.5	6	1.5	0.7	1.9	0.8	^	^	^	^	^
Liver	8	1.0	0.4	1.2	0.4	5	1.4	0.6	1.6	0.7	^	^	^	^	^

"Rates are expressed per 100,000 persons."

Adjusted rates are age-adjusted to the 1970 U.S. standard population.

~ Statistic could not be calculated.

^ Statistic not displayed due to fewer than 5 cases.

Table 1: North Dakota Cancer Incidence by Cancer Type and Sex...(Continued)

	Male and female					Male					Female				
		Adjusted		Crude			Adjusted		Crude			Adjusted		Crude	
	Count	Rate	SE	Rate	SE	Count	Rate	SE	Rate	SE	Count	Rate	SE	Rate	SE
Intrahepatic Bile Duct	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Gallbladder	8	1.0	0.4	1.2	0.4	^	^	^	^	^	7	1.5	0.6	2.2	0.8
Other Biliary	5	0.5	0.2	0.8	0.4	5	1.1	0.5	1.6	0.7	^	^	~	^	~
Pancreas	75	8.7	1.1	11.6	1.3	36	9.4	1.6	11.1	1.9	39	8.2	1.4	12.0	1.9
Retroperitoneum	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Peritoneum, Omentum and Mesentery	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Respiratory System	394	50.7	2.6	60.8	3.1	251	69.3	4.5	77.7	4.9	143	35.6	3.1	44.1	3.7
Nose, Nasal Cavity and Middle Ear	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Larynx	27	3.8	0.8	4.2	0.8	22	6.6	1.4	6.8	1.5	5	1.3	0.6	1.5	0.7
Lung and Bronchus	360	46.3	2.5	55.6	2.9	223	61.3	4.2	69.0	4.6	137	34.2	3.1	42.2	3.6
Pleura	5	0.5	0.3	0.8	0.4	^	^	^	^	^	^	^	^	^	^
Bones and Joints	5	0.8	0.4	0.8	0.4	^	^	^	^	^	^	^	^	^	^
Soft Tissue including Heart	28	3.4	0.7	4.3	0.8	22	5.8	1.3	6.8	1.5	6	1.4	0.7	1.9	0.8
Skin excluding Basal and Squamous	69	8.5	1.1	10.7	1.3	45	12.0	1.8	13.9	2.1	24	5.3	1.2	7.4	1.5
Melanomas of the Skin	57	7.1	1.0	8.8	1.2	36	9.6	1.6	11.1	1.9	21	4.7	1.1	6.5	1.4
Other Non-Epithelial Skin	12	1.5	0.4	1.9	0.5	9	2.4	0.8	2.8	0.9	^	^	^	^	^
Breast	442	55.7	2.8	68.2	3.3	5	1.4	0.6	1.6	0.7	437	105.1	5.3	134.7	6.4
Female Genital System	171	22.5	1.8	26.4	2.0	^	^	~	^	~	171	43.1	3.4	52.7	4.0
Cervix	22	3.2	0.7	3.4	0.7	^	^	~	^	~	22	6.3	1.4	6.8	1.5
Corpus and Uterus, NOS	89	11.7	1.3	13.7	1.5	^	^	~	^	~	89	22.2	2.5	27.4	2.9
Corpus	86	11.2	1.3	13.3	1.4	^	^	~	^	~	86	21.3	2.4	26.5	2.9
Uterus, NOS	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Ovary	50	6.4	0.9	7.7	1.1	^	^	~	^	~	50	12.2	1.8	15.4	2.2
Vagina	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Vulva	5	0.6	0.3	0.8	0.4	^	^	~	^	~	5	1.1	0.5	1.5	0.7
Other Female Genital Organs	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Male Genital System	550	68.1	3.0	84.9	3.6	550	148.9	6.5	170.2	7.3	^	^	~	^	~
Prostate	525	64.7	2.9	81.1	3.5	525	142.2	6.3	162.5	7.1	^	^	~	^	~
Testis	22	3.0	0.6	3.4	0.7	22	5.8	1.3	6.8	1.5	^	^	~	^	~
Penis	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Other Male Genital Organs	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Urinary System	244	29.3	2.0	37.7	2.4	183	48.9	3.7	56.6	4.2	61	13.1	1.8	18.8	2.4
Urinary Bladder	157	18.3	1.5	24.2	1.9	123	32.2	3.0	38.1	3.4	34	6.9	1.3	10.5	1.8

"Rates are expressed per 100,000 persons."

Adjusted rates are age-adjusted to the 1970 U.S. standard population.

~ Statistic could not be calculated.

^ Statistic not displayed due to fewer than 5 cases.

Table 1: North Dakota Cancer Incidence by Cancer Type and Sex...(Continued)

	Male and female					Male					Female				
		Adjusted		Crude			Adjusted		Crude			Adjusted		Crude	
	Count	Rate	SE	Rate	SE	Count	Rate	SE	Rate	SE	Count	Rate	SE	Rate	SE
Kidney and Renal Pelvis	82	10.6	1.2	12.7	1.4	58	16.2	2.2	18.0	2.4	24	5.8	1.3	7.4	1.5
Ureter	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Other Urinary Organs	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Eye and Orbit	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Brain and Other Nervous System	51	7.0	1.0	7.9	1.1	22	6.4	1.4	6.8	1.5	29	7.7	1.5	8.9	1.7
Brain	48	6.6	1.0	7.4	1.1	21	6.1	1.4	6.5	1.4	27	7.2	1.5	8.3	1.6
Cranial Nerves Other Nervous System	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Endocrine System	45	5.8	0.9	7.0	1.0	11	3.0	0.9	3.4	1.0	34	8.8	1.6	10.5	1.8
Thyroid	41	5.4	0.9	6.3	1.0	8	2.1	0.8	2.5	0.9	33	8.7	1.6	10.2	1.8
Other Endocrine including Thymus	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Lymphomas	129	16.3	1.5	19.9	1.8	73	20.3	2.4	22.6	2.6	56	12.5	1.8	17.3	2.3
Hodgkins Disease	12	1.9	0.6	1.9	0.5	8	2.4	0.9	2.5	0.9	^	^	^	^	^
Hodgkins - Nodal	11	1.8	0.6	1.7	0.5	7	2.2	0.9	2.2	0.8	^	^	^	^	^
Hodgkins - Extranodal	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Non-Hodgkins Lymphomas	117	14.4	1.4	18.1	1.7	65	17.8	2.3	20.1	2.5	52	11.2	1.7	16.0	2.2
Non-Hodgkins - Nodal	80	10.3	1.2	12.4	1.4	45	12.6	1.9	13.9	2.1	35	8.2	1.5	10.8	1.8
Non-Hodgkins - Extranodal	37	4.1	0.7	5.7	0.9	20	5.3	1.2	6.2	1.4	17	3.0	0.8	5.2	1.3
Multiple Myeloma	31	3.9	0.7	4.8	0.9	12	3.4	1.0	3.7	1.1	19	4.2	1.1	5.9	1.3
Leukemias	89	11.1	1.2	13.7	1.5	55	15.0	2.1	17.0	2.3	34	7.8	1.4	10.5	1.8
Lymphocytic Leukemia	44	5.8	0.9	6.8	1.0	25	7.1	1.5	7.7	1.6	19	4.6	1.1	5.9	1.3
Acute Lymphocytic Leukemia	8	1.4	0.5	1.2	0.4	5	1.8	0.8	1.6	0.7	^	^	^	^	^
Chronic Lymphocytic Leukemia	34	4.1	0.7	5.3	0.9	19	5.1	1.2	5.9	1.4	15	3.3	0.9	4.6	1.2
Other Lymphocytic Leukemia	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Myeloid Leukemia	33	3.8	0.7	5.1	0.9	22	5.7	1.3	6.8	1.5	11	2.3	0.8	3.4	1.0
Acute Myeloid Leukemia	24	2.8	0.6	3.7	0.8	16	4.2	1.1	5.0	1.2	8	1.7	0.6	2.5	0.9
Chronic Myeloid Leukemia	8	0.8	0.3	1.2	0.4	5	1.2	0.6	1.6	0.7	^	^	^	^	^
Other Myeloid Leukemia	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Acute Monocytic Leukemia	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Other Leukemia	11	1.5	0.5	1.7	0.5	7	2.0	0.8	2.2	0.8	^	^	^	^	^
Other Acute Leukemia	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Aleukemic, Subleukemic and NOS	9	1.2	0.4	1.4	0.5	7	2.0	0.8	2.2	0.8	^	^	^	^	^
Miscellaneous	85	10.0	1.1	13.1	1.4	45	12.0	1.8	13.9	2.1	40	8.1	1.4	12.3	2.0
Invalid Value(s)	41	5.0	0.8	6.3	1.0	27	6.9	1.4	8.4	1.6	14	3.7	1.0	4.3	1.2

"Rates are expressed per 100,000 persons."

Adjusted rates are age-adjusted to the 1970 U.S. standard population.

~ Statistic could not be calculated.

^ Statistic not displayed due to fewer than 5 cases.

Table 2: North Dakota Cancer Mortality by Cancer Type and Sex.

	Male and female					Male					Female				
	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE
All Causes of Death	5,848	605.3	8.5	915.5	12.0	2,983	772.4	14.5	937.5	17.2	2,865	473.3	10.0	893.7	16.7
All Malignant Cancers	1,318	150.2	4.4	206.3	5.7	713	188.8	7.2	224.1	8.4	605	122.4	5.5	188.7	7.7
Oral Cavity and Pharynx	17	2.3	0.6	2.7	0.7	13	3.8	1.1	4.1	1.1	^	^	^	^	^
Lip	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Tongue	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Salivary Gland	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Floor of Mouth	^	^	~	^	~	^	^	~	^	~	^	^	~	^	~
Gum and Other Mouth	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Nasopharynx	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Hypopharynx	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Other Oral Cavity and Pharynx	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Digestive System	327	35.4	2.1	51.2	2.8	191	50.3	3.7	60.0	4.3	136	23.8	2.2	42.4	3.6
Esophagus	24	2.7	0.6	3.8	0.8	22	5.8	1.3	6.9	1.5	^	^	^	^	^
Stomach	36	4.1	0.7	5.6	0.9	27	7.6	1.5	8.5	1.6	9	1.0	0.3	2.8	0.9
Small Intestine	5	0.4	0.2	0.8	0.4	^	^	^	^	^	^	^	^	^	^
Colon and Rectum	157	16.3	1.4	24.6	2.0	91	23.4	2.5	28.6	3.0	66	11.1	1.5	20.6	2.5
Colon excluding Rectum	138	14.3	1.3	21.6	1.8	80	20.6	2.4	25.1	2.8	58	9.8	1.4	18.1	2.4
Rectum and Rectosigmoid Junction	19	1.9	0.5	3.0	0.7	11	2.8	0.9	3.5	1.0	8	1.2	0.5	2.5	0.9
Anus, Anal Canal and Anorectum	^	^	~	^	~	^	^	~	^	~	^	^	~	^	~
Liver and Intrahepatic Bile Duct	21	2.6	0.6	3.3	0.7	12	3.1	0.9	3.8	1.1	9	2.4	0.8	2.8	0.9
Liver	17	2.2	0.6	2.7	0.7	9	2.4	0.8	2.8	0.9	8	2.1	0.8	2.5	0.9
Intrahepatic Bile Duct	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Gallbladder	5	0.6	0.3	0.8	0.4	^	^	~	^	~	5	1.1	0.5	1.6	0.7
Other Biliary	8	0.7	0.3	1.3	0.4	5	1.2	0.6	1.6	0.7	^	^	^	^	^
Pancreas	66	7.4	1.0	10.3	1.3	29	8.1	1.5	9.1	1.7	37	6.5	1.2	11.5	1.9
Retroperitoneum	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Other Digestive Organs	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Respiratory System	335	41.7	2.4	52.4	2.9	212	58.4	4.1	66.6	4.6	123	28.4	2.7	38.4	3.5
Nose, Nasal Cavity and Middle Ear	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Larynx	17	2.2	0.5	2.7	0.7	14	3.8	1.0	4.4	1.2	^	^	^	^	^
Lung and Bronchus	317	39.5	2.3	49.6	2.8	197	54.4	4.0	61.9	4.4	120	27.5	2.7	37.4	3.4
Trachea, Mediastinum and Other Respiratory Organs	^	^	~	^	~	^	^	~	^	~	^	^	~	^	~
Bones and Joints	6	0.9	0.4	0.9	0.4	^	^	^	^	^	5	1.3	0.6	1.6	0.7
Soft Tissue including Heart	11	1.4	0.4	1.7	0.5	6	1.8	0.8	1.9	0.8	5	0.9	0.4	1.6	0.7
Skin excluding Basal and Squamous	19	2.1	0.5	3.0	0.7	9	2.7	0.9	2.8	0.9	10	1.4	0.5	3.1	1.0

"Rates are expressed per 100,000 persons."
Adjusted rates are age-adjusted to the 1970 U.S. standard population.

~ Statistic could not be calculated.
^ Statistic not displayed due to fewer than 5 cases.

Table 2: North Dakota Cancer Mortality by Cancer Type and Sex... (Continued)

	Male and female					Male					Female				
	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE
Melanomas of the Skin	13	1.5	0.5	2.0	0.6	7	2.1	0.8	2.2	0.8	6	1.0	0.5	1.9	0.8
Other Non-Epithelial Skin	6	0.6	0.3	0.9	0.4	^	^	^	^	^	^	^	^	^	^
Breast	107	12.2	1.3	16.8	1.6	^	^	^	^	^	106	21.9	2.4	33.1	3.2
Female Genital System	70	8.1	1.0	11.0	1.3	^	^	~	^	~	70	14.8	2.0	21.8	2.6
Cervix	11	1.5	0.5	1.7	0.5	^	^	~	^	~	11	2.9	0.9	3.4	1.0
Corpus and Uterus, NOS	11	0.9	0.3	1.7	0.5	^	^	~	^	~	11	1.3	0.4	3.4	1.0
Corpus	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Uterus, NOS	7	0.5	0.2	1.1	0.4	^	^	~	^	~	7	0.8	0.3	2.2	0.8
Ovary	41	4.9	0.8	6.4	1.0	^	^	~	^	~	41	9.0	1.5	12.8	2.0
Vagina	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Vulva	5	0.4	0.2	0.8	0.4	^	^	~	^	~	5	0.7	0.3	1.6	0.7
Male Genital System	103	9.7	1.0	16.1	1.6	103	24.2	2.4	32.4	3.2	^	^	~	^	~
Prostate	103	9.7	1.0	16.1	1.6	103	24.2	2.4	32.4	3.2	^	^	~	^	~
Testis	^	^	~	^	~	^	^	~	^	~	^	^	~	^	~
Other Male Genital Organs	^	^	~	^	~	^	^	~	^	~	^	^	~	^	~
Urinary System	68	7.3	0.9	10.6	1.3	45	11.8	1.8	14.1	2.1	23	3.8	0.9	7.2	1.5
Urinary Bladder	30	3.1	0.6	4.7	0.9	21	5.5	1.2	6.6	1.4	9	1.3	0.5	2.8	0.9
Kidney and Renal Pelvis	37	4.1	0.7	5.8	1.0	23	6.0	1.3	7.2	1.5	14	2.6	0.7	4.4	1.2
Ureter	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Eye and Orbit	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Brain and Other Nervous System	40	5.4	0.9	6.3	1.0	16	4.6	1.2	5.0	1.3	24	6.3	1.4	7.5	1.5
Brain	38	5.2	0.9	6.0	1.0	16	4.6	1.2	5.0	1.3	22	5.8	1.3	6.9	1.5
Cranial Nerves Other Nervous System	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Endocrine System	7	0.6	0.3	1.1	0.4	^	^	^	^	^	6	0.9	0.4	1.9	0.8
Thyroid	5	0.4	0.2	0.8	0.4	^	^	^	^	^	^	^	^	^	^
Other Endocrine including Thymus	^	^	^	^	^	^	^	~	^	~	^	^	^	^	^
Lymphomas	62	6.9	0.9	9.7	1.2	33	8.5	1.5	10.4	1.8	29	5.6	1.2	9.1	1.7
Hodgkins Disease	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Non-Hodgkins Lymphomas	60	6.5	0.9	9.4	1.2	32	8.2	1.5	10.1	1.8	28	5.2	1.1	8.7	1.7
Multiple Myeloma	17	1.9	0.5	2.7	0.7	11	3.0	0.9	3.5	1.0	6	1.0	0.4	1.9	0.8
Leukemias	75	8.4	1.0	11.7	1.4	48	12.5	1.9	15.1	2.2	27	5.5	1.2	8.4	1.6
Lymphocytic Leukemia	29	3.4	0.7	4.5	0.8	17	4.5	1.1	5.3	1.3	12	2.8	0.9	3.7	1.1
Acute Lymphocytic Leukemia	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Chronic Lymphocytic Leukemia	23	2.5	0.5	3.6	0.8	14	3.5	1.0	4.4	1.2	9	1.8	0.7	2.8	0.9
Other Lymphocytic Leukemia	^	^	^	^	^	^	^	^	^	^	^	^	^	^	^
Myeloid Leukemia	27	2.9	0.6	4.2	0.8	19	4.8	1.1	6.0	1.4	8	1.5	0.6	2.5	0.9

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~ Statistic could not be calculated.
^ Statistic not displayed due to fewer than 5 cases.

Table 2: North Dakota Cancer Mortality by Cancer Type and Sex... (Continued)

	Male and female					Male					Female				
	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE
Acute Myeloid Leukemia	22	2.3	0.5	3.4	0.7	16	4.1	1.0	5.0	1.3	6	1.1	0.5	1.9	0.8
Chronic Myeloid Leukemia	5	0.5	0.3	0.8	0.4	^	^	^	^	^	^	^	^	^	^
Other Leukemia	19	2.1	0.5	3.0	0.7	12	3.2	1.0	3.8	1.1	7	1.2	0.5	2.2	0.8
Other Acute Leukemia	14	1.7	0.5	2.2	0.6	9	2.5	0.9	2.8	0.9	5	0.9	0.5	1.6	0.7
Aleukemic, Subleukemic and NOS"	5	0.5	0.2	0.8	0.4	^	^	^	^	^	^	^	^	^	^
Miscellaneous Malignant Cancer	53	5.9	0.9	8.3	1.1	22	6.1	1.3	6.9	1.5	31	5.7	1.2	9.7	1.7
Tuberculosis	5	0.5	0.3	0.8	0.4	^	^	^	^	^	^	^	^	^	^
Syphilis	^	^	~	^	~	^	^	~	^	~	^	^	~	^	~
Human Immunodeficiency Virus (1987+)	5	0.7	0.3	0.8	0.4	^	^	^	^	^	^	^	^	^	^
Septicemia	35	3.1	0.6	5.5	0.9	16	3.9	1.0	5.0	1.3	19	2.6	0.7	5.9	1.4
Other Infectious and Parasitic Diseases	12	1.4	0.4	1.9	0.5	5	1.1	0.5	1.6	0.7	7	1.8	0.8	2.2	0.8
Diabetes Mellitus	177	17.7	1.4	27.7	2.1	82	20.5	2.3	25.8	2.9	95	15.8	1.8	29.6	3.0
Diseases of Heart	1,813	178.9	4.5	283.8	6.7	971	251.0	8.3	305.2	9.8	842	120.4	4.6	262.6	9.1
Hypertension without Heart Disease	39	3.3	0.6	6.1	1.0	7	1.6	0.6	2.2	0.8	32	4.4	0.8	10.0	1.8
Cerebrovascular Diseases	492	43.3	2.1	77.0	3.5	206	48.5	3.4	64.7	4.5	286	39.7	2.6	89.2	5.3
Atherosclerosis	66	4.8	0.6	10.3	1.3	18	3.9	0.9	5.7	1.3	48	5.4	0.8	15.0	2.2
Aortic Aneurysm and Dissection	63	6.9	0.9	9.9	1.2	36	9.7	1.6	11.3	1.9	27	4.5	0.9	8.4	1.6
Other Diseases of Arteries, Arterioles, Capillaries	29	2.6	0.5	4.5	0.8	14	3.3	0.9	4.4	1.2	15	2.0	0.6	4.7	1.2
Pneumonia and Influenza	221	18.9	1.4	34.6	2.3	107	24.9	2.5	33.6	3.3	114	15.0	1.6	35.6	3.3
Chronic Obstructive Pulmonary Disease and Allied Cond	239	24.5	1.7	37.4	2.4	138	33.7	2.9	43.4	3.7	101	18.7	2.0	31.5	3.1
Stomach and Duodenal Ulcers	11	1.2	0.4	1.7	0.5	7	2.0	0.8	2.2	0.8	^	^	^	^	^
Chronic Liver Disease and Cirrhosis	55	8.3	1.2	8.6	1.2	32	9.4	1.7	10.1	1.8	23	7.3	1.6	7.2	1.5
Nephritis, Nephrotic Syndrome and Nephrosis	71	5.9	0.7	11.1	1.3	29	6.6	1.2	9.1	1.7	42	5.5	0.9	13.1	2.0
Congenital Anomalies	31	5.0	0.9	4.9	0.9	14	4.4	1.2	4.4	1.2	17	5.8	1.4	5.3	1.3
Certain Conditions Originating in Perinatal Period	20	3.5	0.8	3.1	0.7	10	3.5	1.1	3.1	1.0	10	3.6	1.1	3.1	1.0
Symptoms, Signs and Ill-Defined Conditions	76	7.6	1.0	11.9	1.4	27	7.7	1.5	8.5	1.6	49	6.9	1.1	15.3	2.2
Accidents and Adverse Effects	235	32.5	2.3	36.8	2.4	154	45.5	3.8	48.4	3.9	81	20.0	2.5	25.3	2.8
Suicide and Self-Inflicted Injury	80	12.0	1.4	12.5	1.4	66	19.6	2.5	20.7	2.6	14	4.5	1.3	4.4	1.2
Homicide and Legal Intervention	11	1.5	0.5	1.7	0.5	7	1.9	0.8	2.2	0.8	^	^	^	^	^
Other Cause of Death	744	71.2	2.8	116.5	4.3	316	79.0	4.6	99.3	5.6	428	65.0	3.5	133.5	6.5

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Adjusted rates are age-adjusted to the 1970 U.S. standard population.

~ Statistic could not be calculated.
^ Statistic not displayed due to fewer than 5 cases.

Table 3: Distribution of Stage at Diagnosis by Cancer Type.

	Total Cases	In situ	Localized	Regional	Distant	Unstaged
All Sites	3133	6.30%	40.40%	21.20%	16.40%	15.60%
Oral Cavity and Pharynx	54	3.70%	46.30%	42.60%	3.70%	3.70%
Lip	14	14.30%	85.70%	0.00%	0.00%	0.00%
Tongue	7	0.00%	28.60%	57.10%	0.00%	14.30%
Salivary Gland	10	0.00%	40.00%	50.00%	0.00%	10.00%
Floor of Mouth	^	0.00%	66.70%	33.30%	0.00%	0.00%
Gum and Other Mouth	6	0.00%	66.70%	33.30%	0.00%	0.00%
Nasopharynx	^	0.00%	0.00%	0.00%	100.00%	0.00%
Tonsil	5	0.00%	20.00%	80.00%	0.00%	0.00%
Oropharynx	^	0.00%	0.00%	100.00%	0.00%	0.00%
Hypopharynx	^	0.00%	0.00%	100.00%	0.00%	0.00%
Other Oral Cavity and Pharynx	^	0.00%	0.00%	100.00%	0.00%	0.00%
Digestive System	654	7.20%	25.40%	39.00%	15.70%	12.70%
Esophagus	37	5.40%	18.90%	29.70%	27.00%	18.90%
Stomach	54	0.00%	13.00%	33.30%	22.20%	31.50%
Small Intestine	11	0.00%	0.00%	72.70%	9.10%	18.20%
Colon and Rectum	447	9.80%	30.40%	41.40%	10.10%	8.30%
Colon excluding Rectum	333	9.30%	30.00%	42.30%	11.10%	7.20%
Cecum	83	9.60%	25.30%	39.80%	19.30%	6.00%
Appendix	^	0.00%	0.00%	25.00%	50.00%	25.00%
Ascending Colon	75	6.70%	32.00%	53.30%	4.00%	4.00%
Hepatic Flexure	17	11.80%	35.30%	35.30%	11.80%	5.90%
Transverse Colon	38	15.80%	23.70%	47.40%	5.30%	7.90%
Splenic Flexure	8	0.00%	50.00%	37.50%	0.00%	12.50%
Descending Colon	25	8.00%	16.00%	44.00%	20.00%	12.00%
Sigmoid Colon	73	11.00%	38.40%	39.70%	6.80%	4.10%
Large Intestine, NOS	10	0.00%	40.00%	0.00%	20.00%	40.00%
Rectum and Rectosigmoid Junction	114	11.40%	31.60%	38.60%	7.00%	11.40%
Rectosigmoid Junction	21	19.00%	23.80%	33.30%	14.30%	9.50%
Rectum	93	9.70%	33.30%	39.80%	5.40%	11.80%
Anus, Anal Canal and Anorectum	^	0.00%	75.00%	25.00%	0.00%	0.00%
Liver and Intrahepatic Bile Duct	9	0.00%	11.10%	22.20%	44.40%	22.20%
Liver	8	0.00%	12.50%	25.00%	50.00%	12.50%
Intrahepatic Bile Duct	^	0.00%	0.00%	0.00%	0.00%	100.00%

^ Statistic not displayed due to fewer than 5 cases.

Table 3: Distribution of Stage at Diagnosis by Cancer Type... (Continued)

	Total Cases	In situ	Localized	Regional	Distant	Unstaged
Gallbladder	9	11.10%	22.20%	22.20%	44.40%	0.00%
Other Biliary	5	0.00%	0.00%	40.00%	40.00%	20.00%
Pancreas	75	0.00%	13.30%	34.70%	33.30%	18.70%
Retroperitoneum	^	0.00%	0.00%	0.00%	0.00%	100.00%
Peritoneum, Omentum and Mesentery	^	0.00%	0.00%	0.00%	0.00%	100.00%
Respiratory System	397	0.80%	24.70%	21.90%	41.10%	11.60%
Nose, Nasal Cavity and Middle Ear	^	0.00%	0.00%	0.00%	50.00%	50.00%
Larynx	30	10.00%	60.00%	20.00%	6.70%	3.30%
Lung and Bronchus	360	0.00%	22.20%	21.90%	44.20%	11.70%
Pleura	5	0.00%	0.00%	40.00%	20.00%	40.00%
Bones and Joints	5	0.00%	40.00%	0.00%	40.00%	20.00%
Soft Tissue including Heart	28	0.00%	25.00%	10.70%	17.90%	46.40%
Skin excluding Basal and Squamous	80	13.80%	57.50%	5.00%	1.30%	22.50%
Melanomas of the Skin	68	16.20%	58.80%	4.40%	1.50%	19.10%
Other Non-Epithelial Skin	12	0.00%	50.00%	8.30%	0.00%	41.70%
Breast (female only)	501	12.80%	47.90%	25.70%	4.20%	9.40%
Female Genital System	181	5.50%	50.80%	15.50%	14.90%	13.30%
Cervix	22	0.00%	27.30%	36.40%	13.60%	22.70%
Corpus and Uterus, NOS	93	4.30%	77.40%	8.60%	4.30%	5.40%
Corpus	90	4.40%	77.80%	8.90%	4.40%	4.40%
Uterus, NOS	^	0.00%	66.70%	0.00%	0.00%	33.30%
Ovary 50	0.00%	20.00%	24.00%	36.00%	20.00%	
Vagina	6	33.30%	16.70%	0.00%	33.30%	16.70%
Vulva 8	37.50%	37.50%	0.00%	0.00%	25.00%	
Other Female Genital Organs	^	0.00%	0.00%	0.00%	0.00%	100.00%
Male Genital System	553	0.50%	74.90%	8.50%	3.40%	12.70%
Prostate	527	0.40%	75.90%	7.80%	3.60%	12.30%
Testis 22	0.00%	63.60%	22.70%	0.00%	13.60%	
Penis 3	33.30%	0.00%	33.30%	0.00%	33.30%	
Other Male Genital Organs	^	0.00%	0.00%	0.00%	0.00%	100.00%
Urinary System	244	23.80%	38.10%	15.20%	7.40%	15.60%
Urinary Bladder	157	36.90%	33.80%	9.60%	1.30%	18.50%
Kidney and Renal Pelvis	82	0.00%	47.60%	23.20%	19.50%	9.80%
Ureter 1	0.00%	0.00%	100.00%	0.00%	0.00%	
Other Urinary Organs	^	0.00%	25.00%	50.00%	0.00%	25.00%

^ Statistic not displayed due to fewer than 5 cases.

Table 3: Distribution of Stage at Diagnosis by Cancer Type... (Continued)

	Total Cases	In situ	Localized	Regional	Distant	Unstaged
Eye and Orbit	^	0.00%	0.00%	0.00%	0.00%	100.00%
Brain and Other Nervous System	51	0.00%	35.30%	23.50%	0.00%	41.20%
Brain	48	0.00%	35.40%	25.00%	0.00%	39.60%
Cranial Nerves Other Nervous System	^	0.00%	33.30%	0.00%	0.00%	66.70%
Endocrine System	45	0.00%	66.70%	24.40%	4.40%	4.40%
Thyroid	41	0.00%	68.30%	24.40%	4.90%	2.40%
Other Endocrine including Thymus	^	0.00%	50.00%	25.00%	0.00%	25.00%
Lymphomas	129	0.00%	26.40%	18.60%	31.00%	24.00%
Hodgkins Disease	12	0.00%	25.00%	33.30%	16.70%	25.00%
Hodgkins - Nodal	11	0.00%	27.30%	36.40%	18.20%	18.20%
Hodgkins - Extranodal	^	0.00%	0.00%	0.00%	0.00%	100.00%
Non-Hodgkins Lymphomas	117	0.00%	26.50%	17.10%	32.50%	23.90%
Non-Hodgkins - Nodal	80	0.00%	22.50%	21.30%	35.00%	21.30%
Non-Hodgkins - Extranodal	37	0.00%	35.10%	8.10%	27.00%	29.70%
Multiple Myeloma	31	0.00%	3.20%	0.00%	77.40%	19.40%
Leukemias	89	0.00%	0.00%	0.00%	84.30%	15.70%
Lymphocytic Leukemia	44	0.00%	0.00%	0.00%	86.40%	13.60%
Acute Lymphocytic Leukemia	8	0.00%	0.00%	0.00%	87.50%	12.50%
Chronic Lymphocytic Leukemia	34	0.00%	0.00%	0.00%	85.30%	14.70%
Other Lymphocytic Leukemia	^	0.00%	0.00%	0.00%	100.00%	0.00%
Myeloid Leukemia	33	0.00%	0.00%	0.00%	84.80%	15.20%
Acute Myeloid Leukemia	24	0.00%	0.00%	0.00%	87.50%	12.50%
Chronic Myeloid Leukemia	8	0.00%	0.00%	0.00%	87.50%	12.50%
Other Myeloid Leukemia	^	0.00%	0.00%	0.00%	0.00%	100.00%
Acute Monocytic Leukemia	^	0.00%	0.00%	0.00%	100.00%	0.00%
Other Leukemia	11	0.00%	0.00%	0.00%	72.70%	27.30%
Other Acute Leukemia	^	0.00%	0.00%	0.00%	100.00%	0.00%
Aleukemic, Subleukemic and NOS	9	0.00%	0.00%	0.00%	66.70%	33.30%
Miscellaneous	85	0.00%	0.00%	1.20%	14.10%	84.70%
Invalid Value(s)	43	4.70%	55.80%	0.00%	4.70%	34.90%

^ Statistic not displayed due to fewer than 5 cases.

Table 4: North Dakota Cancer Incidence by County and Region.

	Male and female					Male					Female				
	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE
State of North Dakota	2,993	369.8	7.1	462.1	8.5	1,661	449.3	11.3	514	12.6	1,332	309.1	9	410.4	11.3
Region I	92	239.5	26.3	319.4	33.3	52	292.2	42.4	363.1	50.4	40	196.9	32.7	276.2	43.7
Divide	10	162.8	57.8	412.7	130.5	^	^	^	^	^	6	191	81.9	493.8	201.6
Williams	64	247.2	32.4	311.3	38.9	37	316.2	53.9	364.7	60	27	199.2	40	259.4	49.9
McKenzie	18	239.9	58.6	309.1	72.9	11	289.9	91	370.7	111.8	7	174.4	69.5	245	92.6
Region II	423	368.4	18.8	469.1	22.8	238	447.1	29.8	529.5	34.3	185	309.4	24.4	409.2	30.1
Burke	17	361.5	92.2	724	175.6	11	495.3	158.7	927.5	279.7	6	255.4	107.1	516.4	210.8
Bottineau	54	424.8	63.6	719.8	98	37	610.1	109.1	980.9	161.3	17	265.3	69	455.8	110.5
McHenry	53	500.7	72.6	858	117.9	30	560.3	106.1	953.6	174.1	23	467.7	104.4	758.8	158.2
Mountrail	32	315.9	59.4	479	84.7	21	441.7	101.9	632.9	138.1	11	206.6	65.7	327.2	98.7
Pierce	19	194.3	49.3	415.9	95.4	12	305	94.5	525.2	151.6	7	100	42	306.6	115.9
Renville	14	288.7	84	489.9	130.9	^	^	^	^	^	10	455	155.9	705.7	223.2
Ward	234	369.4	25	389.8	25.5	123	439.9	40.3	412.7	37.2	111	320.7	32.4	367.2	34.9
Region III	216	340.6	24.9	484.8	33	117	407.6	39.1	529.9	49	99	285.6	32.3	440.5	44.3
Benson	21	207.2	50	308.2	67.3	13	296.2	86.5	378.5	105	8	123.2	53.2	236.8	83.7
Cavalier	19	233.9	56.6	368.7	84.6	10	266.9	87.9	390.3	123.4	9	198.9	70.3	347.4	115.8
Eddy	25	480.5	115.1	871.1	174.2	17	754.4	210.4	1,198	290.6	8	235.3	88.6	551.3	194.9
Ramsey	67	335.9	46	539.1	65.9	29	334.6	66	474.9	88.2	38	340.7	64.9	601.1	97.5
Rolette	62	469	61.2	436.4	55.4	32	540.6	96.7	456	80.6	30	429	81.4	417.4	76.2
Towner	22	312.1	73.6	713.8	152.2	16	557	148.5	1,039.6	259.9	6	95.7	41	388.9	158.8
Region IV	343	322.1	18.2	349.9	18.9	178	375	28.7	357.7	26.8	165	284.3	23.6	341.9	26.6
Grand Forks	181	288.5	22.4	254.2	18.9	87	325.2	35.6	239	25.6	94	257.9	28.3	270.1	27.9
Nelson	40	477.3	87	1,047.7	165.7	24	572.8	130.4	1,272.5	259.8	16	414.7	120.7	828.2	207
Pembina	60	466.8	67	687.2	88.7	36	583.4	102.3	828.4	138.1	24	383.2	92.3	547.3	111.7
Walsh	62	288.5	38.6	434.5	55.2	31	293.6	54.8	435	78.1	31	292.8	56	434	78
Region V	663	390.5	15.7	426.7	16.6	353	459.8	24.8	451.6	24	310	340.3	20.3	401.4	22.8
Cass	480	433.2	20.3	414.7	18.9	257	535.6	33.7	444.4	27.7	223	362.5	25.3	385	25.8
Ransom	36	343.3	62.8	614.7	102.4	20	398.2	92.5	659.9	147.6	16	279.1	82.5	566.2	141.5
Richland	63	290.6	38.5	344.4	43.4	34	337.5	60.4	357.7	61.4	29	255	50.5	330	61.3
Sargent	26	386.6	78.3	585.1	114.7	13	366.2	102.2	565	156.7	13	422.8	125.3	606.6	168.3
Steele	17	462.2	115.8	752.9	182.6	6	275.5	113.8	527.2	215.3	11	715.3	220.5	982.1	296.1
Traill	41	275.7	49.2	466.8	72.9	23	349.7	79.6	527.4	110	18	210.7	59.2	407	95.9

Rates are expressed per 100,000 persons.
Adjusted rates are age-adjusted to the 1970 U.S. standard population.

~ Statistic could not be calculated.
^ Statistic not displayed due to fewer than 5 cases.

Table 4: North Dakota Cancer Incidence by County and Region... (Continued)

	Male and female					Male					Female				
		Adjusted		Crude			Adjusted		Crude			Adjusted		Crude	
	Count	Rate	SE	Rate	SE	Count	Rate	SE	Rate	SE	Count	Rate	SE	Rate	SE
Region VI	379	361.8	20.4	613.1	31.5	220	468.5	33.6	726.2	49	159	271.2	24.4	504.4	40
Barnes	52	235.5	37	429.3	59.5	24	248	54.1	405.5	82.8	28	233	52.6	451.9	85.4
Dickey	25	277.8	61.1	440.7	88.1	13	297.5	88.6	465.5	129.1	12	265.4	86.2	416.7	120.3
Foster	25	405.7	85.6	660.7	132.1	13	411.8	118.3	709.2	196.7	12	416.3	125.4	615.1	177.6
Griggs	22	319.6	74.7	774.7	165.2	10	302.9	101.4	703.2	222.4	12	333.3	109.9	846.3	244.3
LaMoure	27	274.7	56.3	549.2	105.7	20	430.4	102	808.4	180.8	7	142.2	56	286.7	108.3
Logan	20	438.2	104.7	824.1	184.3	12	562.9	170	980.4	283	8	320.9	125.2	665	235.1
McIntosh	36	472.8	96.7	1,006.70	167.8	24	684.1	154.6	1,403.50	286.5	12	277.1	115	643.1	185.6
Stutsman	140	457.6	41.1	659.8	55.8	86	645.4	71.9	829.6	89.5	54	309	45.3	497.6	67.7
Wells	32	352.7	71.4	607	107.3	18	509.4	128.4	704.5	166.1	14	190.4	62.2	515.3	137.7
Region VII	654	420.1	16.9	505.1	19.8	359	506.8	27	560.7	29.6	295	354	21.6	450.7	26.2
Burleigh	298	414.1	24.6	443.6	25.7	152	507.9	41.6	465.3	37.7	146	354.2	30.5	423	35
Emmons	24	311	66.7	548	111.9	14	387.9	107.7	628.9	168.1	10	239.8	80.1	464.3	146.8
Grant	29	541.9	107.1	949.6	176.3	16	564.3	147.5	1,030.30	257.6	13	554	163	866.1	240.2
Kidder	17	343.2	86.7	578.8	140.4	11	459	142.1	731.4	220.5	6	245.3	106.4	418.7	170.9
McLean	77	503.6	61.2	786.6	89.6	49	636.8	95	993.1	141.9	28	374.4	76.5	576.7	109
Mercer	58	537.3	74.6	609.3	80	36	724.1	124.1	751.6	125.3	22	346.9	83.2	465.2	99.2
Morton	119	396	37.3	485.6	44.5	64	447.6	56.3	527.6	66	55	362.4	51.3	444.4	59.9
Oliver	9	385.5	130.8	405.4	135.1	^	^	^	^	^	5	404	189.9	477.1	213.4
Sheridan	15	414.8	114.1	840.3	217	9	424.2	145	955.4	318.5	6	407.5	181.1	711.7	290.6
Sioux	8	275.4	98.7	194.5	68.8	^	^	^	^	^	^	^	^	^	^
Region VIII	223	393.6	27.5	565.3	37.9	144	545.5	46.8	736.2	61.4	79	278.4	33	397.2	44.7
Adams	12	265.3	82.4	436.5	126	9	399.8	139.4	663.7	221.2	^	^	^	^	^
Billings	^	^	^	^	^	^	^	^	^	^	^	^	~	^	~
Bowman	25	470.7	99.1	758.5	151.7	15	629.5	168.1	925.4	238.9	10	384	128.3	597	188.8
Dunn	19	316.9	75.6	517.7	118.8	9	332.3	114.2	482.6	160.9	10	321.7	109.2	554	175.2
Golden Valley	11	368.5	120.2	578	174.3	10	755.1	251.5	1,059.30	335	^	^	^	^	^
Hettinger	22	388	88.1	741.2	158	14	539.5	149.5	951.1	254.2	8	268.5	101.8	534.8	189.1
Slope	^	^	~	^	~	^	^	~	^	~	^	^	~	^	~
Stark	133	462.1	41.5	580.6	50.4	86	656.9	72.6	763.1	82.3	47	319.2	48.5	403.9	58.9

Rates are expressed per 100,000 persons.
Adjusted rates are age-adjusted to the 1970 U.S. standard population.

~ Statistic could not be calculated.
^ Statistic not displayed due to fewer than 5 cases.

Table 5: North Dakota Cancer Mortality by County and Region.

	Male and female					Male					Female				
	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE
State of North Dakota	1,318	150.2	4.4	206.3	5.7	713	188.8	7.2	224.1	8.4	320,596	122.4	5.5	188.7	7.7
Region I	77	176.8	21.2	253.2	28.9	45	236.5	36.1	298.7	44.5	15,344	142.7	26.9	208.6	36.9
Divide	12	140.4	41.6	413.9	119.5	10	250.2	79.7	689.7	218.1	1,449	^	^	^	^
Williams	50	179.4	26.6	236.6	33.5	26	219.2	43.8	250.3	49.1	10,743	160.4	35.1	223.4	45.6
McKenzie	15	192.0	50.9	235.0	60.7	9	259.3	88.9	278.6	92.9	3,152	147.9	61.1	190.4	77.7
Region II	199	153.3	11.7	219.4	15.6	103	185.5	18.9	227.9	22.5	45,499	129.2	14.7	211.0	21.5
Burke	11	220.0	72.2	366.4	110.5	9	380.5	138.4	597.6	199.2	1,496	^	^	^	^
Bottineau	24	133.1	31.1	299.6	61.2	15	199.8	57.5	372.2	96.1	3,981	79.9	29.7	226.1	75.4
McHenry	16	115.5	31.3	245.1	61.3	9	135.2	46.6	272.0	90.7	3,219	93.1	41.2	217.5	82.2
Mountrail	21	183.4	43.2	299.1	65.3	11	203.7	63.1	317.1	95.6	3,552	172.5	61.7	281.5	89.0
Pierce	18	172.5	47.1	356.3	84.0	9	232.5	81.6	360.3	120.1	2,554	123.4	54.6	352.4	117.5
Renville	^	^	^	^	^	^	^	^	^	^	1,600	^	^	^	^
Ward	105	161.3	16.4	181.3	17.7	48	179.0	26.2	166.5	24.0	29,097	152.2	21.6	195.9	26.0
Region III	119	161.0	16.1	262.7	24.1	56	178.6	24.8	249.8	33.4	22,872	145.8	21.3	275.5	34.7
Benson	9	67.7	24.2	125.0	41.7	^	^	^	^	^	3,567	102.2	38.9	224.3	79.3
Cavalier	12	93.9	29.6	197.9	57.1	6	112.7	47.1	197.9	80.8	3,032	82.1	39.7	197.9	80.8
Eddy	12	164.2	52.3	406.6	117.4	8	268.8	101.9	548.7	194.0	1,493	^	^	^	^
Ramsey	39	174.2	31.4	307.6	49.3	17	191.4	48.7	273.3	66.3	6,460	156.0	40.8	340.6	72.6
Rolette	34	267.2	46.8	266.2	45.7	17	306.6	75.0	271.5	65.8	6,510	242.2	61.5	261.1	63.3
Towner	13	161.7	55.1	358.4	99.4	7	181.0	72.1	385.3	145.6	1,810	164.2	91.5	331.5	135.3
Region IV	186	161.2	12.6	189.5	13.9	95	196.8	20.6	190.8	19.6	48,380	138.5	16.0	188.1	19.7
Grand Forks	100	166.7	17.4	141.5	14.2	46	184.9	27.5	127.3	18.8	34,541	160.3	23.4	156.3	21.3
Nelson	17	145.6	40.9	385.5	93.5	10	183.8	63.2	458.3	144.9	2,228	115.8	54.2	314.2	118.8
Pembina	29	155.0	30.7	313.9	58.3	16	216.0	55.8	349.6	87.4	4,661	109.1	32.6	278.9	77.4
Walsh	40	145.1	24.9	289.0	45.7	23	206.8	45.5	333.8	69.6	6,950	91.6	23.7	244.6	59.3
Region V	233	141.2	9.7	163.3	10.7	131	182.4	16.1	183.6	16.0	71,319	113.7	12.3	143.0	14.2
Cass	163	165.0	13.3	158.5	12.4	84	204.4	22.4	164.1	17.9	51,693	140.2	16.9	152.8	17.2
Ransom	12	98.0	29.9	202.7	58.5	12	208.0	61.7	396.4	114.4	2,894	^	~	^	~
Richland	32	121.3	23.5	176.3	31.2	19	150.5	35.4	204.3	46.9	8,847	103.7	32.9	146.9	40.8
Sargent	9	114.9	39.5	197.9	66.0	6	159.7	65.4	257.0	104.9	2,214	^	^	^	^
Steele	^	^	^	^	^	^	^	^	^	^	1,205	^	^	^	^
Traill	14	77.2	22.3	160.0	42.8	8	99.1	35.9	186.7	66.0	4,466	66.5	31.5	134.4	54.9

Rates are expressed per 100,000 persons.

Adjusted rates are age-adjusted to the 1970 U.S. standard population.

~ Statistic could not be calculated.

^ Statistic not displayed due to fewer than 5 cases.

Table 5: North Dakota Cancer Mortality by County and Region... (Continued)

	Male and female					Male					Female				
	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE	Count	Adjusted Rate	SE	Crude Rate	SE
Region VI	190	149.2	12.0	286.6	20.8	107	198.9	20.5	329.0	31.8	33,768	110.1	14.0	245.8	27.0
Barnes	27	102.2	22.7	215.2	41.4	16	146.0	39.5	261.4	65.4	6,425	69.5	25.8	171.2	51.6
Dickey	12	111.8	36.2	196.5	56.7	6	126.5	54.4	198.3	81.0	3,081	96.4	48.3	194.7	79.5
Foster	13	168.0	52.3	326.4	90.5	8	240.1	92.7	410.9	145.3	2,036	116.3	57.5	245.6	109.8
Griggs	13	152.7	47.8	393.6	109.2	8	244.2	99.6	487.5	172.4	1,662	80.4	36.5	300.8	134.5
LaMoure	10	91.8	33.3	185.8	58.8	7	140.0	53.7	256.9	97.1	2,658	^	^	^	^
Logan	10	198.0	67.0	351.3	111.1	7	312.3	123.3	486.8	184.0	1,409	^	^	^	^
McIntosh	27	233.0	51.4	671.5	129.2	12	246.1	82.3	618.2	178.5	2,080	230.2	67.9	721.2	186.2
Stutsman	58	173.1	24.1	260.8	34.2	36	268.7	46.3	331.7	55.3	11,388	102.9	23.1	193.2	41.2
Wells	20	165.8	42.8	341.1	76.3	7	134.8	53.6	246.9	93.3	3,029	188.7	64.1	429.2	119.0
Region VII	242	153.3	10.2	195.0	12.5	130	189.9	16.8	211.7	18.6	62,697	125.4	12.7	178.6	16.9
Burleigh	103	157.2	15.8	171.3	16.9	50	190.2	27.0	171.4	24.2	30,959	129.7	18.9	171.2	23.5
Emmons	14	140.2	40.3	289.9	77.5	7	142.3	54.2	284.1	107.4	2,366	146.1	62.4	295.9	111.8
Grant	7	106.9	41.3	197.2	74.6	5	155.3	69.7	277.9	124.3	1,750	^	^	^	^
Kidder	8	136.4	49.8	240.1	84.9	^	^	^	^	^	1,615	^	^	^	^
McLean	30	178.7	34.7	286.9	52.4	19	235.5	56.8	359.9	82.6	5,177	127.0	40.8	212.5	64.1
Mercer	18	158.1	39.3	183.5	43.3	11	227.0	70.0	222.3	67.0	4,860	95.4	38.7	144.0	54.4
Morton	51	165.0	23.9	215.2	30.1	26	197.8	39.2	221.8	43.5	11,976	156.4	33.1	208.8	41.8
Oliver	^	^	^	^	^	^	^	^	^	^	1,144	^	^	^	^
Sheridan	^	^	^	^	^	^	^	^	^	^	1,034	^	~	^	~
Sioux	^	^	^	^	^	^	^	^	^	^	1,816	^	^	^	^
Region VIII	72	121.3	15.1	174.9	20.6	46	179.4	27.2	224.9	33.2	20,717	79.6	16.9	125.5	24.6
Adams	10	143.8	50.3	315.1	99.6	7	213.5	84.1	446.1	168.6	1,605	^	^	^	^
Billings	^	^	^	^	^	^	^	^	^	^	529	^	~	^	~
Bowman	6	98.9	41.7	166.9	68.1	^	^	^	^	^	1,835	^	^	^	^
Dunn	8	147.6	55.3	199.8	70.6	7	268.3	107.0	339.0	128.1	1,940	^	^	^	^
Golden Valley	^	^	^	^	^	^	^	^	^	^	1,035	^	^	^	^
Hettinger	^	^	^	^	^	^	^	^	^	^	1,735	^	^	^	^
Slope	^	^	^	^	^	^	^	^	^	^	429	^	~	^	~
Stark	37	119.9	20.5	162.1	26.6	20	152.1	34.8	178.2	39.9	11,609	100.7	25.7	146.4	35.5

Rates are expressed per 100,000 persons.

Adjusted rates are age-adjusted to the 1970 U.S. standard population.

~ Statistic could not be calculated.

^ Statistic not displayed due to fewer than 5 cases.

Appendix B
Technical Notes

Summary Comments on Data Analysis and Interpretation

Various measures commonly used in epidemiological studies of cancer were used in this annual report on cancer in North Dakota. One measure is the incidence rate, which provides information about the frequency with which cases are occurring in the population over time. Another measure is the mortality rate, which is the rate of deaths due to cancer in the North Dakota population over time. Age-adjusted rates are calculated to allow comparisons between two different populations (i.e., North Dakota and the U.S.) whose age distributions differ.[1] As a measure of disease severity and/or prognosis, the report includes the mortality-to-incidence (M/I) ratio. Under conditions of stable rates, the M/I ratio may be considered as the chance of eventually dying from a specific cancer (at current cure rates); the M/I ratio is a case fatality rate. Values closer to 0 may be interpreted as having a good prognosis whereas values closer to 1.0 may be interpreted as having a poor prognosis.

In this report, we present incidence and mortality data across geographic boundaries.[2] This analysis may help target screening and/or educational efforts. However, because we have only one year's worth of incidence data, some counties with small populations have only a few cases reported. Because small numbers make rates unstable, these data must be interpreted with caution. Data from future years can be aggregated, yielding better information for health policy and program planning.

We also present the incidence data by stage at the time of diagnosis. For some cancers, early detection through screening has proven beneficial. Cancers such as female breast cancer and colorectal cancer have fewer deaths associated with early detection screening activities.

The years of potential life lost (YPLL) index is included as another measure of the burden of cancer in North Dakota. The YPLL quantifies premature mortality from cancer occurring in younger age groups. Lost potential years can be interpreted as lost productive years (both economic and non-economic) that a person dying prematurely of cancer would have contributed to society if he or she had survived. A person dying of cancer at age 35 would have had 30 more years of potential life lost than a person dying of cancer at age 65.

Finally, we compared North Dakota data to neighboring states' and national data to provide a context for understanding North Dakota's rates. The reader must use caution when interpreting age-adjusted rates between two populations. Age-adjusted rates take into account the differences between

[1]Please refer to the sections on age-adjusting and comparison of age-adjusted rates below.

[2]These geographic areas (regions) are described below.

the size and age distribution of each population, thereby facilitating comparisons. However, the interpretation of differences in the rates for a particular type of cancer must be made with caution. There are several reasons why it is difficult to attribute such differences to variation in known risk factors for a specific cancer site. First, the rarity of some cancers can cause the number of cases occurring in some regions to be so small that observed rate estimates may be unstable statistically. Therefore, tests for statistical difference must be performed to examine whether differences in observed rates are the result of chance. Second, correlations between incidence of a disease and the prevalence of risk factors for that disease in geographical areas can be misleading. To examine the relationships between a risk factor and a disease, detailed analytical epidemiological studies are necessary. Third, for many cancers there is a long time interval between exposure to a risk factor and the diagnosis of the disease. Migration between geographical areas can result in individuals being exposed to a risk factor in one geographical area and then diagnosed in a different geographical area. Fourth, there may be differences between geographical areas with respect to the availability of screening and/or early detection programs. Fifth, it is possible that the completeness of case reporting differs by area of the state.

Age-Adjusted Rates

Since cancer rates tend to vary with age, and since populations vary with respect to their age distribution, incidence and mortality rates are age-adjusted to allow comparison of rates between different populations (i.e., regional boundaries). Age-adjustment allows rates to be compared between population groups with different age distributions. Age-adjusted rates are calculated by the direct method, using the age distribution of the 1970 United States standard population. Under the direct method of age-adjusting, the population was first divided into 18 reasonably homogeneous age groups of five-year intervals. The age-specific rate was calculated for each five-year age group; next, each age-specific rate was weighted by multiplying it by the proportion of a standard population of the respective age group. Lastly, the weighted age-specific rates were summed, giving the resulting age-adjusted rate. Rates are calculated separately for males, females, and the total population using identical weights.

All age-adjusted rates are expressed as events per 100,000 individuals per year. By convention, incidence rates are usually calculated with only invasive cases in the numerator. However, incidence rates for bladder cancer include in situ cases.

Wherever possible, age-adjusted rates include their corresponding standard error and 95 percent confidence interval, because the data may be affected by random variation. A standard error and/or confidence

interval can be used to describe that range of variation. The confidence interval describes the range of rates, which have a desired probability of containing the "true" rate. For example, a 95 percent confidence interval for female breast cancer of 108.3 to 118.0 (per 100,000 women) describes the range of the age-adjusted rate which has a 95 percent probability of containing the "true" age-adjusted rate for female breast cancer if repeated incidence measures were taken in this population. By convention, confidence intervals are calculated at the 95 percent level in this report. Different confidence levels can be calculated from the standard error. The standard error for each age-adjusted incidence and mortality rate is provided in the statistical tables, thereby leaving the construction of different confidence intervals to the individual researcher.

Although mortality data, when published separately, commonly use the 1940 U.S. standard population for age-adjusting, the mortality data in this report uses the 1970 U.S. standard population. This was done so that age-adjusted incidence and mortality rates could be compared directly. However, caution must be taken when comparing the age-adjusted mortality rates in this report to age-adjusted mortality rates published elsewhere.

Comparing Age-Adjusted Rates for Statistical Significance

Age-adjusted incidence and mortality rates for specific geographic areas (i.e., regions) may be compared to determine whether differences exist between the areas. It is important to note that rates based on small numbers of events for a given period of time or for a sparsely populated geographic area must be viewed with caution. A small number of events results in considerable random variation in the rate estimate, thus limiting their usefulness. Therefore, if the number of cancer events (new cases or deaths) is five or fewer, then the calculated rate is considered unstable. A carrot (^) in the tables denotes an unstable rate. When the rate is considered unstable, it is not shown.

Testing for differences between two rates (i.e., the state's average rate and an individual region's rate) can be performed by comparing 95 percent confidence intervals for each population. To construct a 95 percent confidence interval, a standard error (SE) for each rate is needed. The following formula can be used to calculate the variance of an age-adjusted rate[3]:

$$SE(AAIR) = [\Sigma_a (C_a / L_a^{\,2})(POP_a^{\,2} / POP_{tot}^{\,2})]^{0.5}$$

where SE is the standard error, AAIR is the age-adjusted incidence rate, C_a is the number of events in age group "a" from the study population, L_a is

[3]Goodman, MT and Wilkens, LR, Calculation and Assessment of Incidence Rates in Chapter 9 of Central Cancer Registries: Design, Management, and Use (Hardwood Academic Publishers GmbH, Switzerland), 1994.

the number of person-years in age group "a" from the study population, POP_a is the population size in age group "a" from the standard population, and POP_{tot} is the total size of the standard population. The 95 percent confidence interval then takes the form of:

Lower Limit: AAIR - 1.96 (SE)

Upper Limit: AAIR + 1.96 (SE)

Rates are considered statistically different if the two 95 percent confidence intervals do not overlap. For example, let's assume North Dakota's AAIR for all cancers combined is 377.1 per 100,000 population with a SE of 3.3 and Region IV's AAIR for all cancers combined is higher at 416.4 per 100,000 population with a SE of 8.1. Plugging these numbers into the above formulas for the upper and lower 95 percent confidence interval limits reveals:

North Dakota's Lower Limit: 377.1 - 1.96(3.3) = 370.7
North Dakota's Upper Limit: 377.1 + 1.96(3.3) = 383.5

Region IV's Lower Limit: 416.4 - 1.96(8.1) = 400.5
Region IV's Upper Limit: 416.4 + 1.96(8.1) = 432.2

Since the 95 percent confidence interval for Region IV (400.5, 432.2) does not overlap the state's 95 percent confidence interval (370.7, 383.5), the two age-adjusted rates are considered to be significantly different. The confidence interval describes the range of rates, which have a desired probability of containing the "true" rate if repeated incidence measures were taken in the population.

Case Ascertainment and Case Completeness

To determine the completeness of reporting, we compared the number of reported cancers to the projected number of cancers for North Dakota (estimated from national data).

Completeness of Cancer Reporting — North Dakota 1997

Cancer	Incidence Estimate	Incidence Actual	Incidence Pct	Mortality Estimate	Mortality Actual	Mortality Pct
All Cancers	3,100	3,002	96.8%	1,500	1,423	94.9%
All Cancers Less Prostate and Malignant Melanoma	2,200	2,419	110.0%	1,310	1,301	99.3%
Female Breast	490	440	89.8%	120	117	97.5%
Cervix	5	22	440.0%	5	10	200.0%
Colorectal	350	304	86.9%	150	353	235.3%
Lung	340	361	106.2%	310	317	102.3%
Malignant Melanoma	100	57	57.0%	20	12	60.0%
Pancreas	70	75	107.1%	70	68	97.1%
Prostate	800	526	65.8%	170	110	64.7%
Urinary Bladder	180	157	87.2%	40	32	80.0%

Estimated cancer incidence and mortality figures provided by the American Cancer Society's "Cancer Facts and Figures - 1997"

The North Dakota Cancer Registry is estimated to be about 97 percent complete cancer incidence reporting for 1997 (see above table). The anatomical site of origin of a cancer was known and reported for 98 percent of all the invasive cancers, and the stage of progression of the cancer at the time diagnosis was determined for nearly 84 percent of reported cancers.

Completeness of cancer case ascertainment is estimated by the percentage of expected cases received in any given reporting year. For the first year of reporting, the NDCR based its expected number of cases to be collected based on the American Cancer Society (ACS) estimates. The ACS provides estimates of newly diagnosed invasive cancers and cancer mortality, by site, for all states in the United States. The ACS estimates use SEER incidence and mortality figures in the forecasting formula of North Dakota's estimates. Caution must be applied when interpreting case ascertainment data when a forecasting formula utilizing a national index is used. Such a national index may incorrectly estimate any given state's expected cancer incidence and/or mortality figures. Now that North Dakota has its own cancer registry, more accurate projections of North Dakota-specific cancer incidence and mortality will be possible in the future using a North Dakota mortality/incidence (M/I) ratio.

Glossary

Age: The age of the patient (in completed years) at the time of diagnosis or death.

Age-adjusted rate: Since cancer rates tend to vary with age, and since populations vary with respect to their age distribution, incidence and mortality rates are age-adjusted to allow comparison of rates between different populations (i.e., county or regional boundaries). Age-adjustment allows rates to be compared between population groups with different age distributions. In this report, age-adjusted rates are calculated by the direct method, using the age distribution of the 1970 United States standard population. Rates are calculated separately for males, females and the total population. All age-adjusted rates are expressed per 100,000 individuals per year and include rates of invasive cancer only. (Please refer to the Technical Notes for more detail on age-adjustment of rates.)

Age-specific incidence rate: The number of new cases diagnosed per 100,000 individuals over a specified time period for a specified age group. Age-specific rates show the variation in cancer incidence by age. Age groups are divided into five-year age groupings (i.e., 0-4, 5-9, 10-14, ..., 75-84, and 85+).

Cancer site: The human organ or system in which the malignancy originates; the anatomical site.

Childhood cancer: Cancer occurring in an individual between the ages of 0 and 14 is classified as a childhood cancer. Acute lymphocytic leukemia is the most frequent malignancy of childhood cancer, followed by astrocytomas and neuroblastomas.

Crude rate: The number of new cases of cancer or cancer deaths during the year expressed as a rate per 100,000 people in the population, without regard to the ages of the people.

ICD-9: The ninth revision of the International Classification of Diseases.[4]

ICD-O: The Second Edition of the International Classification of Diseases for Oncology. A further classification of the ICD-9 designed for use specifically for cancer.[5]

Incidence: The number of new cases of a given type of cancer diagnosed during the year.

Mortality: The number of deaths attributed to the particular type of cancer that occurred during the year. Includes deaths of patients diagnosed in earlier years, individuals newly diagnosed during the year, as well as patients for whom a diagnosis of cancer is made only after death.

[4] World Health Organization. *International Classification of Diseases.* 1975 Revision. Volumes 1 and 2, Geneva, 1997.
[5] World Health Organization. *International Classification of Diseases.* Second Edition. Geneva, 1990.

M/I ratio: The M/I (mortality-to-incidence) ratio provides a measure of disease severity. The M/I ratio is the number of deaths divided by the number of invasive cases (for a particular cancer). The closer a value is to 1.0, the poorer the prognosis for that cancer. Cancer sites can be classified into three groups according to their M/I ratio: those with a very good prognosis (a ratio of 33 percent or less), those with a fair prognosis (a ratio between 33 percent and 66 percent), and those with a poor prognosis (a ratio greater than 66 percent). Access to early diagnostic and treatment care can impact the M/I ratio.

Stage at diagnosis: Stage at diagnosis refers to how far a cancer has spread from its site of origin when it is diagnosed. There are several different systems for the staging of cancers. This report uses the general summary stage system. The stages, in order of increasing spread, are in situ, localized, regional and distant. Cancers diagnosed at the localized, regional or distant stage are referred to as invasive. A small percentage of cancers will be diagnosed with an unknown or unspecified stage; these are referred to as unstaged. Staging data on all reportable cancers follow SEER guidelines for general summary stage.

- In Situ: A tumor that fulfills all microscopic criteria for malignancy but does not invade or penetrate surrounding tissue.
- Localized: A tumor that is invasive but remains restricted to the site of origin.
- Regional: A tumor that has spread by direct extension to adjacent organs or tissues and/or metastasized (e.g., spread) to regional lymph nodes but appears to have spread no further.
- Distant: A tumor that has spread by direct extension beyond adjacent organs or tissues and/or metastasized to distant lymph nodes or other distant tissues.
- Unstaged: There is insufficient information available to determine the stage of disease at the time of diagnosis.

Years of potential life lost (YPLL): A measure of the cancer burden in a population. This measure quantifies pre-mature mortality occurring in younger age groups by measuring the number of years between an individual's age at death and a preset standard age at death.

Internet Resources for Cancer and Health Information

Many web sites are available for locating cancer information. Several sites are listed below.

American Cancer Society

www.cancer.org

Centers for Disease Control and Prevention – National Program of Cancer Registries

www.cdc.gov/cancer/npcr/index.htm

Consumer Health Information Resource

www.healthfinder.gov

National Cancer Institute – Information on treatment, prevention, detection and coping with effects of cancer

www.cancernet.nci.nih.gov

National Comprehensive Cancer Network

www.nccn.org

North Dakota Department of Health

www.health.state.nd.us

OncoLink University of Pennsylvania Cancer Center

www.oncolink.upenn.edu

Women's Issues

www.4woman.gov

Women's Way (North Dakota Breast and Cervical Cancer Early Detection Program)

www.womensway.net